

National Environmental Science Program

Sustainable Communities and Waste Hub
research plan 2025 – Attachment B project
plan-IP5 (variation)



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Project IP5.05 – Informing Australia’s Circular Economy Transition (Waste Impact Management Research)

Project type: • Hub research project	
Project status: • Existing projects requiring amendment to scope and deliverables	
Cross-cutting initiative:	No
Project start date: 01/07/2022 For IP5.04.01-01/07/2024	Project end date: 31/12/2026
Project leader details:	Name: Dr Heinz Schandl, Dr Stefan Kaufman Organisation: Commonwealth Scientific and Industrial Research Organisation, Monash University Sustainable Development Institute For IP5.02.04 Name: Dr Pia Interlandi- Curtin University Dr Roberto Minunno- Curtin University

Pathway to impact

Outcomes
The waste impact management research will deliver several outcomes, including: • knowledge products that include metrics and data on material flows, waste, emissions, resource recovery, and the circular economy for decision-makers in Commonwealth, State, and local governments and for businesses in the waste management and resource recovery sector. • identifying novel approaches for specific resource recovery problems achieved through novel science and engineering contributions and amenable to be put to national and local use. • fostering a science-based understanding of the institutional and governance arrangements that can enable regional community based circular economy initiatives and networks that encourage value add to materials to occur many times over resulting in economic and employment benefits. The science informs business decision and communal approaches that result in reduce primary material requirements, increased secondary content in products and infrastructure, and workable cycles arrangements leading to tangible reduction in material use, waste to landfill and emission and also reducing the environmental impacts (climate change, natural resource depletion, biodiversity loss, toxic waste issues) that are related to natural resource use creating significant and measurable environmental benefits. • Capacity building and collaboration with Aboriginal communities: Through the co-design process, the project will involve Aboriginal communities, fostering their self-determination and decision-making capabilities in addressing waste issues. Additionally, the project will create opportunities for promoting circular economy practices within both urban and remote Aboriginal communities. • Institutional and Governance Enablers: The project will contribute a science-based understanding of institutional and governance structures that effectively support regional, community-based circular economy initiatives. This comprehension will facilitate the enhancement of material value, driving economic growth and employment benefits. Active engagement with Indigenous communities and businesses will remain a pivotal aspect of this endeavour. • ensuring research with Aboriginal communities delivers clear, practical benefits back to community by closing the loop on earlier phases (returning findings in accessible formats), and by prioritising a skills-based approach that supports self-determination and aligns with the AIATSIS Code of Ethics principles of reciprocity, sustainability and accountability. • undertaking a deep-dive on clothing and textiles as a priority waste stream identified through earlier yarning circles and business case studies, to understand how textiles move into, through and out of community, and to develop circular economy responses that are culturally grounded, feasible in practice, and able to be taken up locally. • documenting barriers and enablers for textile reuse and repair in the local context (including limited awareness of reuse options such as OpShop donation, and the disruption of intergenerational making, mending and reuse skills), and identifying practical pathways to rebuild capability in ways that respect and reflect Aboriginal relationships to Country, kinship and community knowledge-sharing.

- delivering a pilot textile reuse workshop with the Champion Centre to trial a culturally safe, hands-on approach to reuse and upskilling; and documenting participation, what outcomes participants value, priority skills and materials, what works operationally, and what would be required to support an ongoing, community-led program (including governance, resourcing, and ICIP considerations).
- assessing feasibility and appetite for sustaining the workshop model beyond a pilot (including potential pathways for ongoing facilitation, materials sourcing, and participant support), and determining which elements could be adapted for remote community contexts—including constraints around storage, redistribution, and the risk that unsold or unsuitable garments can themselves become waste in settings with limited infrastructure.

Research-user	Engagement and communication	Impact on management action	Outputs
DCCEEW waste policy and circular economy and international teams; environment departments of States and Territories; industry representatives in the waste management and resource recovery sector (IP5.04.01)	Engaging in research framing and co-delivery; regular reports; tailored presentations; online database and visualization tools; peer-reviewed publications	The data and indicators will enable to establish a baseline of circularity in the Australian economy and alternative scenarios and can inform policy statements and allow to set targets and monitor achievements	Datasets; reports; peer-reviewed journal publications; webinars; fact sheets; policy briefings
State and Territory governments (IP5.04.01)	Engaging with State and Territory governments to establish a harmonised approach for the assessment of material flows and circularity; tailored presentations	To support decision making of State and Territory governments and to develop an improved understanding of circular economy opportunities; align State and Territory governments with national circular economy measurement agenda	Datasets; reports; presentations
ACE Hub (IP5.02.03)	Input into regional survey, collaborating on distribution and recruitment,	Our collaboration has increased their engagement and attention on the experiences and challenges of regional and remote LGA areas, and they are highly interested in working further with the project.	Sharing results with Aus CE community; opening a dedicated regional and remote LGA space on their platform, sharing learning and resources from trials.
Regional and remote LGA CE staff (IP5.02.03)	Piloting survey, sharing experiences and cases, and later, participating in online community, participating in trials, co-designing network governance approach.	None at present. By 2027 it is expected that there will be widespread adoption of the resulting regional and remote network governance for CE framework.	It is expected that peer to peer learning will occur in the online community, councils will want to participate in trials co-design and implementation; and benefit from learning (locally) and share them widely (across the population). Specific trials will have specific outputs emerging from the co design process.

Research-user	Engagement and communication	Impact on management action	Outputs
DCCEEW policy areas (note we are actively reconnecting after MoG changes and project focus update) (IP5.02.03)	Invited for input into survey at March 2023 showcase, participating in online community, participating in trials, co-designing network governance approach.	None at present. We anticipate the survey results and socio-technical transect analysis to generate strategic and practical policy insights and will be working across 2023 to build relationships towards this outcome.	Survey report and analysis Socio-technical transect Resources and insights from trials Insights across trials relevant to key policy issues.
Various state government agencies with CE responsibilities (IP5.02.03)	Consultation and information sharing thus far	We have shared results with state and federal governments and have integrated feedback into the survey report	Survey report and analysis Socio-technical transect Resources and insights from cases and trials Insights across cases trials relevant to key policy issues.
Local councils and regional communities (IP5.02.03)	Typology of regional councils regarding their circularity potential and needs, local experiments adding depth to the typology	Pathway for collaboration with industry and local policy community in place-based experiments	National Database of regional CE initiatives. Analysis and reporting of the socio-spatial-technical influences on regional CE innovation. Experimentation with some regions on facilitating regional transformation
Various Aboriginal Land and Sea Councils (IP5.02.04)	Engage in co-design workshops with selected land councils and community organisations	Identify suitable and representative Aboriginal communities for the project	List of selected Aboriginal stakeholder groups for the scoping study
Indigenous Communities (IP5.02.04)	Listening tour and codesign process	Explore potential waste management and circular economy solutions	Yarning circles on identified waste management issues and circular economy solutions. Research product will be communicated with the Indigenous people or prepared as suitable for the same community to understand.
Various Aboriginal Land and Sea Councils (IP5.02.04)	Deepening local relationships through the engagement of indigenous researcher	Supporting in research capacity, report writing and publication	Contributing to the final report, conference presentation and scholarly publications
Project Team and Researchers (IP5.02.04)	Work closely Champion Centre and with Indigenous facilitator to re-establish connections	Develop and test first circular economy workshop	Final project report synthesizing key findings and opportunities for reusing garnishments embedding Aboriginal art and experiences.
Champion Centre (Indigenous community organisation, WA) and Whadjuk Noongar community	Co-design and deliver a pilot clothing/textile reuse & upskilling workshop with the community (at/with Champion Centre).	Identify practical, community-led textile reuse pathways (skills, materials, governance/resourcing, ICIP considerations).	Co-designed workshop plan + pilot workshop documentation (participation, valued outcomes, requested skills/materials, operational requirements, ICIP notes)

Research-user	Engagement and communication	Impact on management action	Outputs
participants (IP5.02.04)	Document outcomes and return findings in accessible formats.	Assess feasibility for sustaining the model and adapting elements for remote contexts (including learnings from Remote Op Shop constraints).	• A feasibility assessment/recommendation for an ongoing community-led model (incl. remote adaptation considerations).
Additional outputs • Important scientific contributions of national significance communicated to various audiences via targeted short and accessible communication pieces such as short articles in industry journals and generally accessible media such as The Communication • Presentations and short videos for industry partners, communities and the government sector as well as the public • Research findings will be peer-reviewed through scholarly publication. • On-demand policy and business briefs to inform planning and decision making as part of the ongoing engagement with research users and other interested parties • Capacity building for early career researchers and local government • Engagement with the Champion Centre to ensure community involvement • Pathway to social and environmental benefits through test workshop and yarning			

Project description

Project summary

Within the Sustainable Communities and Waste (SCaW) Hub, the theme called Impact Priority 5 Waste Impact Management (IP5) applies both qualitative and quantitative research focusing on research-user application for waste management, resource recovery and of circular economy and waste policy implementation.

RP2025 aims to address five important aspects of waste impact management research:

- To provide information, data and management tools
- To inform design for repurposing waste and circular economy focussing on business models and enabling conditions
- To inform the institutional and governance needs of community-based resource recovery and circular economy initiatives
- To identify waste management and resource recovery opportunities for Indigenous communities
- To create an evidence-base for decision makers based on novel science contributions and informing solutions for problems of national significance.

In RP2025, the IP5 proposal contains three projects:

- Project IP5.04.01: Metrics, data and indicators for material flow and stocks, waste and emissions to monitor progress of Australia's circular economy transition.
- Project IP5.02.03 Governing community-based waste management and resource recovery and circular economy initiatives.
- Project IP5.02.04 Identifying opportunities from waste management and resource recovery and the circular economy for Indigenous communities and Indigenous businesses.

These projects each span three years to create continuity necessary for high quality research outputs and the desired outcomes and impacts. The projects will provide novel information about the state of circularity and resource recovery in Australia, identifying priorities and opportunities in different material supply chains. It will also develop guidance on the governance of a community based circular economy with examples for communities in Victoria and Tasmania, and with indigenous communities and businesses in Western Australia.

Design of the projects was informed by broad co-design with a range of research-users within and external to the Department and research achievement of RP2021 and RP2022 (ongoing).

Project description

RP2025 for the waste impact management research builds on the achievements of RP2022 and RP2023. Over the last 2 years significant research progress has been achieved on which RP2024 can now build to scale-up and scale-out activities in the domains of metrics, data and indicators, regional circular economy governance models and their application at council scale and research collaboration with Indigenous communities and businesses.

Each project

- describes the problem that it will address and has been identified in close collaboration with prospective research contributors and research-users
- outlines the science response and the outcomes and impacts of the research

- reflects on the science and national dividend of the research
- identifies linkages with research in other impact priority areas of the SCaW Hub.

Project IP5.04.01: Metrics, data and indicators for material flow and stocks, waste and emissions to monitor progress of Australia's circular economy transition

The problem

Australia's environment ministers met in Brisbane in October 2023 and committed to work with the private sector to design out waste and pollution, keep materials in use and foster markets to achieve a circular economy by 2030. Subsequently, the Australian Minister for the Environment and Water has established a circular economy ministerial advisory group who, as one of its priorities will advise the Minister on **effective measurement and communication about progress towards Australia's circular economy**. Despite this articulated need for metrics, data and indicators to measure and monitor progress of Australia's circular economy transition, the Government lacks a good understanding of Australia's material and waste flows within our borders and in global supply chains. In this regard we are falling behind the success of measuring the circular economy in the European Union, Japan and China among others. This is despite Australia's competitive strong research and development ecosystem with Australia's universities and research institutes actively engaged in advancing the global knowledgebase of measuring progress of the circular economy. The CSIRO, University of Sydney and UNSW have been world leading for more than a decade in this area of research but this has not resulted in commensurate research activity for Australian policy makers.

Our response

Building on foundational work on material flows for the Department of Environment (Schandl et al. 2018) and a study to implement an update of Australia's material flows for the year 2019 including an assessment of Australia's circularity (Miatto et al. 2023) in the context of this research Hub (project IP5.02.01), we will further improve Australia's knowledgebase for measuring progress of circular economy at the national, State and territory and industry and product level. This will include investigating opportunities for growing Australia's circularity potential and achievement.

Activities and research methodology

This project will employ the most up-to-date international methodologies and analytical tools for the assessment of Australia's material and waste flows. This includes full alignment with the UNEP, OECD and EUROSTAT methods handbook (UNEP, 2021) which has been drafted by a global consortium under the leadership of the CSIRO. It is fully compatible with the System of Environmental Economic Accounting (SEEA) framework and therefore also complementary to the system of economic accounts. We also employ the most advanced and most detailed global multi-regional input-output database GLORIA (Lenzen et al. 2022) and a highly detailed Australian input-output table which is nested in the GLORIA framework. This arrangement allows investigation of domestic and global material supply chains across their whole life cycle, from source to sink and to calculate production and consumption-based indicators of material use, waste and emissions in one analytical framework. We will use Australian and global datasets for materials extraction, trade of materials and consumer goods, waste and emissions and calculate indicators according to globally agreed methodology. The analytical capacity of our research frameworks will allow us to push the cutting edge of the current understanding of measuring circularity and hence improve the knowledgebase for policy making and monitoring and evaluation of policy efficacy, efficiency and effectiveness.

Outputs

This project will produce yearly reports on Australia's material flows, waste and recycling including a detailed dataset. It will extend the current accounts initially to a time series 2010 – 2024 establishing a baseline for Australia's per capita material use (SDG 12.2), resource productivity (SDG 8.4) and circularity. It aims for a high-level of data granularity to address the policy needs of the Department and address the whole spectre of circular economy opportunities that exist across material supply chains. It will look at direct and embodied flows (i.e., footprints) to assess volumes managed in Australia and within Australia's international supply chains. The level of data detail will depend on data availability and will be reviewed and agreed on with the Department.

- The 2025 report will include a time series of data and indicators for the 2010 – 2024 period to establish a baseline of Australia's performance in sustainable materials management, resource efficiency and circular economy. The baseline can inform future policy ambition and potentially establishing targets for key indicators.
- The 2026 report will align the assessment of Australia's material flows with the associated environmental impacts of climate change, biodiversity loss, resource depletion and pollution. This can be linked to different policy domains and the connections with the planetary boundaries framework and indicators will be discussed.
- The 2027 report will include an outlook for Australia's material flows, waste and circularity to 2050 for two scenarios – a baseline scenario based on current policies and an ambitious policy scenario developed with input of the Department.

The specifics of each yearly report can be further framed by input from the Department, and other stakeholders and thematic extensions can be considered pending additional funding. The project team will engage with the Australian Bureau of Statistics (ABS) to ensure complementarity of work programs and adding value to the ABS data sets.

Outcome and impact

The recent report developed under IP5.02.01 on material flows, waste and circularity (Miatto et al. 2023) presented an initial assessment of resource efficiency and circularity for the Australian economy. The availability of a yearly comprehensive report of material flows, waste (and emissions) and circularity will inform the policy process in Australia and will position Australia well internationally in several processes and for specific reporting initiatives.

- Australian environmental (Federal and State and Territories) policy makers will have metrics data and indicators available to assess the state of sustainable material management, resource efficiency and circularity of the Australian economy. This will ensure consistency for reporting for different levels of government and will avoid costs caused by potential duplication and contradiction of effort. The reporting and associated datasets will be a service the Department can provide to state and territory environmental departments.
- The fact that the Australian accounts adhere to complementarity between environmental and economic accounts will enable an economically informed environmental policy perspective. Linking environmental impacts to material flows employing the Driver-Pressure-State-Impact-Response (DPSIR) framework allows to harmonise economic and conservationist policy stances.
- Indicators derived from the accounts can inform the environmental domain of the Treasury's 'Measuring What Matters' report. Initially, headline indicators such as material footprint, domestic material consumption and resource productivity can be supplied to the Treasury report. In future, additional indicators can be included.

- Through regular reporting, Australia will be on par with countries that are leading in environmental economic reporting such as the European Community and Japan. It will allow Australia to will assume an international leadership role which can positively influence other players in our region, including the fast-growing economy of India or the ASEAN community creating new opportunities for collaboration for regional sustainability initiatives.
- Regular reporting will allow Australia to deliver against the SDG indicators and the SEEA data initiative. Australia, as a resource extractive economy (posing very specific challenges and opportunities), will provide valuable insights about sustainable materials management and circularity to the global science and policy community.

Research-users

The knowledgebase created by this project will be used by the Department and by State and Territory environment departments to support their efforts to transition the Australian economy to a circular economy. The focus for the yearly reporting will be agreed with the Department's waste policy and circular economy teams and will adapt to those needs as needed. The project team will seek feedback from the ABS and State governments for key outputs.

The Australian material flow and circularity data can be shared with users through an online data portal depending on additional funding for a data platform and data visualisation. This needs to be achieved in the context of the SCaW Hub data strategy.

Special attention will be given to communicate research results that can have benefit for Indigenous communities and businesses.

Science innovation and national importance

Research undertaken in this project addresses several knowledge gaps including:

- developing a data infrastructure based on digital capability and a collaborative network of data providers and research-users
- extending the analytical tools of material flow analysis, life cycle analysis and environmentally extended input output analysis to address the whole life cycle of materials, from cradle to grave
- Continued development of novel datasets, construction of meaningful indicators
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The detailed data set that will underpin the circularity gap assessment will allow for identifying priorities and aligning policy needs with data and information at the national, state and industry level and for specific material and waste flows.

Capacity building of early career researchers

A key focus of this project is to enhance research capacity by supporting a post-doctoral researcher who will support the metrics work at the State and Territory level which will result in employing additional data sources and exploring various methods for estimating trade flows between States and Territories and the rest of the World. The additional research capacity will result in more robust and reliable datasets. It will free up leadership capacity to engage with State government experts working on circular economy metrics, to benefit from locally held data, and build capacity at the State and Territory governments. This includes developing innovative methods for conducting sub-national material and waste flow analyses and identifying priority areas for circular economy interventions. The additional funding from the SCaW Hub will help build future research capability and develop the post-doctoral researcher into a fully-fledged

research scientist in the circular economy, which has become a national policy, science, and innovation priority.

Linkages

This work creates synergies with IP3 “Hazardous waste, substance and pollutants” by allowing for analysing environmental impacts and eco and human toxicity of waste flows. It also creates contamination pathways for the Resilient Landscapes and Marine and Coastal Hubs.

Project IP5.02.03 Governing community-based waste management and resource recovery and circular economy initiatives

The problem

Our initial co-design and investigations during RP2021 and RP2022 highlighted that regional and remote Australia faces distinct challenges and opportunities transitioning to the circular economy (CE). Much of the existing research, practice and policy focuses on metropolitan locations, and surprisingly little is known about the good, and the bad, of what is happening in remote and regional areas, which makes up most of Australia. Our initial depth case studies of three regional council areas in Victoria and Tasmania highlighted that CE innovations in these areas depend as much on ‘circular society’ (i.e., civil, community and government actors) as entrepreneurs and business. If it generally true that good governance strategies and well-functioning institutional arrangements are required to maximise the benefits of community-based resource recovery and realise the ‘triple bottom line’ potential of CE in urban Australia, it is likely to be even more so in regional and remote Australia. Further, opportunities for CE differ depending on the character of regional populations, industries and logistics, strategies developed need to be responsive to location-specific characteristics and offer practical solutions for remote and regional communities. Activity in 2023-24 surveyed the priority material issues, innovative responses, capabilities and partnerships regional and remote local governments are pursuing in pursuing the transition to regional circular economies. While its clear innovative regional CE initiatives are emerging ‘organically, they face substantial challenges in progressing beyond concept phase. This raises questions for how DCCEEW and other stakeholders can help existing initiatives implement, scale up and transfer successful models; whether or not they can be ‘seeded’ where gaps exist, and the role of key system orchestrators or ‘transition brokers’ in helping in both scenarios.

Our response

We have identified that regional and remote place-based initiatives , are, playing a pivotal role, working closely with state and federal programs and industry from the ‘top down’ while also serving local community and business. Local government actors can be both enablers and transition brokers’, with the role shifting between players at different times and places. Local government actors can be both an enabler, but also a ‘transition broker Recognising this, the overarching theory of change for this initiative is that by collaborating with place-based initiatives, the Australian Circular Economy Hub (ACE Hub) and relevant state and federal agencies, we can develop a model for networked CE governance best suited to supporting regional CE in Australia. This research complements the information-sharing haring role of ACE Hub’s local government portal with knowledge generation on fit-for-purpose networked governance. By documenting existing regional responses to this challenge, and where opportunities allow, proto-typing and developing tools and responses, we will both fill gaps in research and knowledge and help advance practical outcomes on the ground. We will extend existing local government networks of regional CE stakeholders and provide a platform to facilitate future CE collaborations between different regional initiatives that also linkswith state and federal government initiatives for CE.

The outcome will be a networked governance strategy that can be rolled out nationally that will facilitate forms of 'bottom-up' regional initiatives that encompass social as well as technological solutions and draws on relevant geographically coded data-collection initiatives including, potentially, household behaviour change surveys.

Activities and research methodology

Work in year 2 and year 3 (RP2022 and RP2023) focused on developing a national baseline survey of the CE challenges faced by local government in regional and remote Australia, their capacity to be transition brokers, and what innovations are emerging in response. In RP2024, the results were presented at Circularity in November 2023, where we received expressions of interest from innovative local government champions, and build connections between them, supporting knowledge sharing and collaboration. We also presented into DCCEEW's CE branch internal seminar series in January 2024, and were subsequently invited to engage with the CE policy team on 'place-based' initiatives in July 2024 in support of their Ministerial Advisory Committee secretariat work. This dialogue raised new questions. In short, feedback on the survey work we did in late 2022 - early 2024 lead to a partial pivot where instead of focusing in 2024-2025 on 'what works' style experiments, we will instead build a data base of regional CE initiatives in Australia to understand the socio-spatial determinants and interventions that support more CE innovation in remote and regional areas. Our revised research questions in the next phase will explore:

RQ1: To what extent do regional and remote CE collaborations emerge organically? Why and why not?

RQ2: What explains why many individual regional and remote CE initiatives stall at the conceptualisation/pilot phase? Does it make a difference if they occur in a place-based regional collaboration or not?

RQ3: What are the most important roles (including but not limited to transitions brokers), and stakeholders (including different layers of government, business, research and community), for

a) helping boost place based regional collaborations forming where there are gaps

b) boost existing place based collaborations, especially where their initiatives stall at conceptualisation/pilot phases?

c) bolster existing place based collaborations to scale up and mainstream their initiatives?

RQ4: What do the findings of 1-3 suggest for a proposed national approach to facilitating regional and remote CE innovation?

Approach:

For the remainder of 2024 and into 2025, we will pro-actively identify and approach regional initiatives involving but not limited to local government, with greater detail on those that are most illuminating and generalisable, in terms of identifying key segments of regional and remote Australia. We are expanding on the on survey results (i.e. CE issues, and innovative solutions and capability to broker), geography and Waste Demographics Data generated by RP2024 activity to create database of current and emerging regional circular economy initiatives This combined view will provide a 'socio-technical profile' of CE in remote and regional Australia.

The intention is to generate cross-case comparisons in 'socio-technical transect', which will facilitate teasing apart how different elements of regional CE initiatives, council capability, regional characteristics and location shape the capacity and success of CE regional indicatives. Each case study will identify potentially scalable products and resources from the interventions, and these will be progressively documented and shared in the online community with ACE hub.

The addition of new funding to support a part-time post doc will expand both the breadth of the regional initiatives database by increasing our ability to cover more sites; and the depth, increasing our capacity to responsively partner with interested regional groups to explore experimental interventions to governance and behavioural issues identified in the socio-technical transect.

The focus of July 2026-December 2026 will be finalising any ongoing case studies and contributions to on ground trials and consolidating and sharing learning and resources. We will also repeat the survey conducted in RP2023 to track changes and trends in issues and capability in regional and remote local governments, and update and refresh the data portal and online community contacts. The results will give some indication of population level changes and trends the initiative has contributed to. The most direct evaluation of impact will be benchmarking progress against examples identified in 2024, where we can attempt to benchmark changes in the trial council areas against their peers in the broader population of regional and remote Australian local governments.

This sets the stage for the capstone report), where learning will be documented into a national networked governance strategy for CE in regional and remote Australia.

Outputs

Key outputs will include:

- In-depth case studies report of three regional local government areas (LGA) DONE – publication in progress
- Survey of regional and remote CE issues and capacity, national baseline DONE – publication to start
- Online regional and remote LGA community of practice ON- HOLD pending ACE Hub initiative
- Report - Generate socio-technical profile, research design and recruit case study participants – in PROGRESS
- Report – Case study database plus update on trial co-design and deployment (where feasible) JUNE 2026, associated publications
- Report – dashboard update of survey July 2026
- Report – summative report presenting national networked governance strategy. – July 2026

Outcome and impact

RP2023 feeding into RP2024

- Outcome: CE ecosystem of Australia (as represented by Circularity 2023 participants) have increased understanding of CE challenges, capabilities and innovative responses in regional and remote local government areas

- Impact: state, federal and community organisations see value in co-investment of in-kind and direct funding for dashboard, community and trial preparation.
- Outcome: Increased connection, knowledge sharing and collaboration between regional and remote area local government CE champions (via online community)
- Impact: high levels of organic engagement in the online community (3+ posts a week)
- approximately 30 Eols for case study participation (e.g., at least approx. 10% of the regional and remote Australian LGA areas).
- Outcome: Shared understanding of the socio-technical profile of CE innovation in regional and remote Australian amongst the Community of industry, government and community stakeholders formed around the project, and agreement on key knowledge and action gaps suitable for trials
- Impact: agreement to co-invest in additional trials.

RP2025

- Outcome:
 - Co-designed case studies and/or trials with high levels of ownership, relevance and coherence within each location selected (locally valid insights)
 - Increased understanding of what works for whom, under what circumstances, and why, to facilitate CE innovations in regional and remote Australian locations represented by each case or trial
 - Insights into implementation and integration challenges and solutions in each trial
- Impact:
 - While each trial will have local level impacts, tracked as part of the impact and process evaluation of each trial and specified as part of the co-design process for the trial, broader identifiable impacts are not expected in this year.

RP2026

- Outcome:
 - Understanding of what works for whom, under what circumstances and why **across** cases (generally valid insights)
 - Increased capability, collaboration and knowledge sharing between regional and remote local government areas and their stakeholders
 - Uptake and engagement with knowledge products and resources generated in case studies
 - Increased understanding of trends and changes in CE issues, brokering capability and solutions in regional and remote Australia amongst project stakeholders
 - Shared understanding of a potential model for network governance towards the CE in regional and remote Australia amongst project stakeholders.

- Impact:
 - Transfer and uptake of specific interventions used in trials in new locations
 - Increased overall incidence of CE innovations across regional and remote Australia
 - Increased capability for transition brokering in regional and remote LGAs
 - In principle support of in-kind and financial support for ongoing activity after capstone year

Research-users (as at December 2024)

Organisations/agencies	Co-design	Information sharing	In kind support	In principle Funding support
Local governments,	Y	Y	Y	
Community organisations (including Indigenous organisations)	Y	Y		
Charitable Recycling Australia		Y	Y	
Champion Centre, WA	Y	Y		
ACE Hub	Y	Y	Y	
DCCEEW policy areas (note we are actively reconnecting after MoG changes and project focus update)		Y		Y
Sustainability Victoria / Recycling Victoria		Y		Y
Victorian Department of Energy, Environment and Climate Change Action		Y		
Victorian Circular Economy Business Innovation Centre (CEBIC)		Y		
Circular Economy Victoria		Y		
ASPIRE (strong presence in Ballarat)		Y	Y	
State Growth and Rethink Waste Tasmania				Y
Northern Tasmania Waste Management Group	Y	Y	Y	
Northern Tasmania Development Corporation	Y	Y	Y	
Tasmanian Farms and Graziers Association			Y	Y
Bell Bay Aluminium		Y	Y	Y
Environex		Y	Y	Y
Launceston City Mission	Y	Y	Y	
Australian Packaging Covenant Organisation		Y	Y	Y

Special attention will be given to communicate research results that can have benefit for Indigenous communities and businesses.

Science innovation and national importance

In local governments and regional communities across Australia there are many ‘bottom-up’ initiatives relevant to transitioning to a CE with less waste, yet existing models for CE policy prioritise commercial actors and top-down approaches. Our research will develop an innovative

networked governance approach to CE modelled on the Cities for Climate Change Program and informed by Jacquelin Cramer's work on 'How Networked Governance Powers the Circular Economy'. Generating a socio-technical transect of regional and remote Australia for CE transitions will add to both scientific and policy understanding and action on how to transition towards the CE in these challenging locations.

Capacity building of early career researchers

A key focus of this project is to enhance research capacity by supporting a Postdoctoral researcher who will help design, then populate, a national data base of place based, regional CE initiatives around the country. The PD researcher will also assist the team with place-based CE ecosystem collaboration mapping (i.e. providing interventions to support regional initiatives). Both activities will enable them to build networks and contacts regional and with policy makers and industry, while also deepening their research skills, and build engagement and extension skills, establishing them for a career bridging research, policy and practice.

Linkages

The project aligns with IP5.02.04 study creating opportunity from waste in Aboriginal Communities in Western Australia, in that the local government data collected will help with contextualising, scaling and translating from the Armadale research to other contexts. We also anticipate the online community will be interested in learning from the results. We have completed Indigenous cultural awareness training and are consulting with Indigenous researchers within the SCAW Hub about approaches to engaging with Indigenous community organisations in RP2023.

The project aligns closely with IP2.02.02 "Reduced impact of plastics and other materials" and, less directly, with IP3.02.01 "Hazardous waste, substance and pollutants" as community-scale CE initiatives contribute to overall reduction in waste generation. There are further linkages with IP1.02.02 due to the focus on local scale community-based initiatives, especially as they have recently completed a survey of regional and remote Australia's engagement with water sensitive cities and nature-based solutions.

We are actively exploring integrating the socio-technical transect analysis and case selection approach described above with IP2 and IP1.

Project IP5.02.04 Identifying opportunities from waste management and resource recovery and the circular economy for Indigenous communities and businesses

The problem

According to the 2016 census, Western Australia represents the largest population who live in remote and very remote communities. Waste management and the lack of appropriate infrastructure and human resources for waste management and resource recovery in Indigenous communities is a perennial problem creating environmental and health risks and presenting a missed economic opportunity. According to APCO's recent report on waste management in regional communities (APCO 2020), the number of different types of waste, including automotive waste and end-of life appliances and other consumer waste, is growing fast in Indigenous communities. Waste management in urban and remote Aboriginal communities is limited. Indigenous communities in regional and remote settlements are often poorly equipped to benefit from repurposing waste and instead suffer the consequences of accumulating waste and pollution.

Our response

In a scoping study the project team, in close collaboration with the SCAW Hub's Senior Indigenous Facilitator and an Indigenous researcher, will identify suitable Aboriginal communities

and engage in a process to identify the magnitude and characteristics of the local waste problem. The project will also explore potential opportunities for managing waste, recovering resources, and creating economic and employment opportunities.

As a first step, a listening tour will be undertaken to find interested communities who wish to engage with the Hub research. The project will also aim to identify local community champions and will engage in a co-design process that is respectful of the local culture and practices. Aboriginal voices and representation will be ensured at all stages of the project. Consultation will be undertaken in first language to the extent possible.

Initially, the team will work with the Indigenous communities to describe the problem and the issues well and will start to identify possible solutions enabled through logistics, technologies, behaviour change and capacity building.

Activities and research methodology

This project is a continuation of work undertaken in RP2022, however is requesting an extended timeframe to allow adequate time for effective and appropriate discussion and engagement with Aboriginal communities. In RP2022, it took longer than anticipated to secure the interest of the Aboriginal community in the Swan-Canning area. The Whadjuk Noongar community in the Armadale area has been identified for the project. The community is ready for yarning and sharing their knowledge to the project, and the yarning will start upon securing ethical approval (submitted in July 2023). Moreover, the co-design of yarning activities with the community representatives has been incorporated in the revised RP2023 timeframe.

RP2022 (Year 1) This scoping study in RP2022-2023 sought to engage the Aboriginal Land and Sea Councils in Western Australia, particularly in the Swan-Canning catchment area to identify Aboriginal communities interested in engaging in this project. As WA has the highest representation of remote and very remote population in Australia, the study approached interested communities to conduct co-design workshops to help identify the significance of the waste problems in the Aboriginal communities and the communities' willingness to participate in the IP5 project. Western Australia was also chosen because of strong existing networks with Indigenous communities of Curtin University. The Whadjuk Noongar community in WA was identified as a representative Aboriginal community based on the interest expressed by local Aboriginal communities and the potential for collaboration with the research project. To conduct yarning activities with the Aboriginal communities, the research team collaborated with the Champions Centre, which serves as a gathering place for Aboriginal peoples and agencies working with Aboriginal families and communities. The Champions Centre offered an inclusive, neutral environment to promote healing for various groups within the local area, facilitate reconciliation, build bridges for families, share knowledge, and connect with the Armadale community to promote hope and opportunities.

RP2023 (Year 2) Building upon the relationship formed in RP2022, the nominated and interested Indigenous communities were considered as focus groups in RP2023. Yarning circles and one-on-one yarning (interview) with the relevant community members were conducted to understand community priorities in addressing the waste problem through various circular economy approaches. A total of 6 yarning series were conducted at Champion Centre followed by 2 field visits of the littering problems within the bushes. The preliminary findings were presented at the NESP Steering Committee and End-users of the project. The study helped build on existing Indigenous knowledge about resource efficiency and circularity and how they can be applied for today's product and waste flows. As part of the research team, an Indigenous researcher will assist in communicating with Indigenous communities regarding various waste management provisions and opportunities and seeking community feedback.

RP2024 (Year 3) A participatory and co-design approach of multi-stakeholders' engagement have been be considered to develop a deployable and practical implementation plan for the identified (in year 3) waste management priorities (e.g., education, knowledge and capacity building) and circular economy solutions (e.g., decentralised/community-based resource recovery provisions). Based on community feedback, the current round of the project has completed a series of one-to-one yarning with the business that directly and indirectly involves Indigenous communities to address problems while creating opportunities for the communities. The circular economy business solutions considered most suitable through the codesign process to enable resource recovery and job creation while addressing waste management challenges in urban Indigenous communities have been investigated. .

Year2026 (Year 5)

Rationale and Context

Phases I and II produced exploratory qualitative findings about waste management challenges and circular economy opportunities within the Whadjuk Noongar community in the Armadale area of Western Australia. While context-specific and preliminary in scope, these findings established important groundwork and meaningful community relationships. Through yarning circles with Elders, community members, and a youth group, and five business case studies examining circular economy models across Aboriginal communities in Western Australia, the Northern Territory, and Queensland, the research identified priority waste streams, community-held knowledge about sustainable practice, and a range of potential circular economy responses grounded in Aboriginal values and ways of knowing.

Section 8.3 of the Phase II report identifies four dimensions along which findings should inform the next phase: contextual grounding, priority areas, barriers and enablers, and stakeholder mapping. Phase III responds directly to each, going deeper into one priority area the community itself identified. The AIATSIS Code of Ethics principles of reciprocity, sustainability, and accountability, which the report adopts as its ethical framework, are explicit that research conducted with Aboriginal communities must deliver benefit back to those communities. Phase III approaches this not as a report-back exercise but as an opportunity to respond to what community members said they needed, in a form that is practical and skills-based.

The research team leading Phase III is new to the project. Dr Pia Interlandi and Dr Roberto Minunno bring complementary expertise in creative practice, fashion design, textile research, and circular economy methodology. Both are undertaking cultural training through Terri Janke and Company's True Tracks program in May 2026. Continuity with the community and the project's history will be re-established through Beck Barlow, a lecturer in the School of Design and the Built Environment at Curtin University, who contributed to the original research as an Indigenous researcher and yarning facilitator, and whose creative practice, Deadly Denim, is one of the five business case studies in the Phase II report. Barlow brings intersecting roles to Phase III as researcher, practitioner, and community participant. Her knowledge of what the community needs from this project extends beyond the formal written record, residing in the relational and conversational spaces the research created. Re-engaging Barlow and bringing that knowledge into the formal record is the first priority of Phase III. Interlandi and Minunno will work in close collaboration with Barlow, while ensuring the community remains at the centre of the research process.

Phase III focuses on clothing and textiles as an opportunity to go deeper into one thread of the existing research, supported by evidence from the yarning circles and two of the five business case studies.

The yarnning circles identified clothing as a challenging waste stream that accumulates because people lack accessible reuse pathways. Youth participants noted that awareness of even basic options such as op shop donation is limited. More significantly, participants identified the disruption of intergenerational making and reuse skills as a structural driver of the problem. Practices such as quilting from fabric scraps, passing clothing between generations, and repurposing worn garments were recalled not as recycling strategies but as expressions of the Aboriginal relationship to Country. The report is explicit that colonisation and the disruption of kinship models severed the transmission of this knowledge, and that restoring it requires connection, skill, and practice.

The Deadly Denim case study demonstrates that a culturally grounded response is viable. Barlow's practice of reworking and redesigning second-hand garments, embedding Aboriginal artwork, extending textile lifespan, and running hands-on workshops across diverse community settings is described in the report as a model with strong potential for scaling and community empowerment. The report explicitly recommends expanded upcycling workshops, an Aboriginal-run textile hub in Perth, and the embedding of reuse skills in education as priorities for next steps. Phase III is a direct operational response to those recommendations.

Barlow's practitioner knowledge also points to a challenge at the endpoint of redistribution models such as the Remote Op Shop: garments not sold or redistributed in time can themselves become waste, deteriorating in storage conditions remote communities are not resourced to manage. This will be brought into the formal record in Phase III, sharpening the central research question: not only how clothing reaches community, but what community members can do with clothing that would otherwise be discarded.

Key Research Steps

1. Re-engage Barlow and reconnect with the Champion Centre and Whadjuk Noongar community participants to close the loop from Phases I and II. This step prioritises relationship and trust before research, returning findings in an accessible way and confirming shared priorities in accordance with ATR and AIATSIS ethical engagement principles.
2. Co-design a pilot reuse and upskill workshop with the community, incorporating known practical constraints including garment sourcing and materials quality.
3. Deliver the pilot workshop at or with the Champion Centre, with Barlow as lead facilitator, and document outcomes including participation, what participants value, what skills are requested, what materials work, and what would be required to make it an ongoing and community-led activity. Where community interest exists, explore whether workshop outputs could become sellable with proceeds returning to participants, and document the cultural, practical, and ICIP considerations this raises.
4. Assess feasibility and appetite: evaluate whether the workshop model could be sustained as a community-led initiative and what parts, if any, could realistically be adapted for remote community contexts.
5. Conduct a focused qualitative assessment of the textile waste stream as it relates to remote Aboriginal communities, informed by a follow-up conversation with the Remote Op Shop coordinator. If time and budget allow, validate findings through a short remote community visit.

Timeline Month	Milestone	Activity
May 2026	Research priorities and Phase III approach agreed and documented.	Initial team meeting to re-engage Barlow, establish shared priorities, confirm roles, and bring her relational knowledge into the formal research record.
June 2026	Community re-engagement initiated. Remote Op Shop conversation completed. Feasibility of remote assessment confirmed or deferred.	Re-engagement with the Champion Centre, facilitated through Barlow's existing relationships. Introduction of the new research team to the community. Initial conversation with Tanya Egerton, Remote Op Shop, to scope the remote assessment component.
July to August 2026	Co-designed workshop plan confirmed. Materials sourced. Ethics approval granted if required.	Community consultation on workshop design in a format determined by the community. Workshop structure, content, and logistics co-designed with community input. Garment and materials sourcing confirmed. Ethics approval sought if required.
September to October 2026	Workshop pilot delivered and documented. Community responses and outputs recorded. Remote visit completed if feasible. ICIP considerations documented.	Workshop delivery with Barlow as lead facilitator. Documentation of participation, outputs, and community responses. ICIP considerations addressed throughout. Remote visit undertaken if confirmed feasible.
November 2026	Findings synthesised. Feasibility assessment completed. Recommendations for future phase drafted.	Synthesis of findings from the workshop pilot and, if applicable, the remote assessment. Feasibility of a sustainable community-led textile reuse model assessed.
December 2026	Final report submitted to NESP2.	Consolidation of findings and preparation of final report. No new community engagement or delivery activities.

Output with amended deadlines for deliverables

Key outputs include:

- A list of key Aboriginal stakeholder groups identified for the scoping study
- A series of yarning circles with communities on waste management (urban and regional/remote)
- A series of yarning circles with communities on waste management priorities and possible CE community-led business solutions (urban and regional/remote)
- Report summarising results from community discussions and presentation of findings to the community – urban

Report - summarising results from community discussions and presentation of findings to the community – regional/remote.

Outcome and impact

The research will identify a community, establish a relationship of trust and mutual understanding, and engage in a co-design process to identify the relevant waste management problems and possible circular economy solutions in the urban and regional/remote Aboriginal communities. Through co-design workshops and yarning circles, the project will ensure active participation and decision-making by Indigenous communities, respecting their self-determination and leadership. The project's commitment to ongoing engagement, co-design, and knowledge exchange will work to foster long-lasting relationships with Aboriginal communities, ensuring the research's relevance, value, and positive impact. The findings and recommendations from the project will provide valuable insights to inform policies, programs, and practices for waste management and circular economy initiatives, ultimately benefiting Aboriginal communities across various locations. The project's adherence to the AIATSIS Code of Ethics principles will lay a strong foundation for responsible and culturally sensitive research, and its outcomes are expected to contribute positively to community well-being, environmental sustainability, and social equity.

Indigenous land councils and Indigenous communities and business which will be identified in the process of the scoping study, along with the end-user identified by the department.

In its final Phase III, the IP5.02.04 project will turn the earlier qualitative findings into a practical, skills-based intervention that delivers direct benefit back to community by re-engaging Aboriginal communities and reconnecting with the Champion Centre and Whadjuk Noongar participants to confirm priorities and “close the loop” from Phases I and II. In Phase III, the researchers will co-design and pilot a clothing/textile reuse and upskilling workshop (including real-world constraints like garment sourcing and materials quality). Through documenting the outcomes that matter to participants (e.g., participation, valued outcomes, requested skills, and what is required for an ongoing community-led activity, including ICIP considerations), the research team will then report on the findings producing a pathway for tangible impact through direct involvement of Aboriginal community members. It will also assess feasibility and appetite for longer-term impact, including whether the model can be sustained locally and what elements could be adapted for remote contexts, informed by a

focused assessment of textile waste issues in remote Aboriginal communities (including insights from Remote Op Shop contexts).

Research users

Insights from this research will benefit indigenous communities and businesses and will be communicated in face-to-face workshops in verbal presentations and tailored communication pieces. It may also guide State and local government initiatives in enabling indigenous circular economy initiatives.

In Phase III, the research users will further expand from Phases I and II by actively involving communities with participatory workshops tailored based on the appetite of community members to engage in clothes repair and upvalue.

Science innovation and national importance

Addressing the waste management problems of regional and remote Indigenous communities and the identification of the possible economic and employment opportunities based on resource recovery is a central objective of the National Environmental Sciences Program. Research into creating wealth from waste at the community level is still in its infancy and the solutions-oriented approach taken by the Hub research will, if successful, inform local solutions more generally and will create insights that are applicable in other geographical and cultural context.

Phase III innovates the current scenario of textile waste by providing a blueprint to embed Aboriginal knowledge, experiences and art to save garments and textile from landfills. Not only Phase III will provide Aboriginal members with the knowledge and skills to repair and upvalue garments, but it will also help decrease waste by embedding circular economy principles of material repair and reuse.

Capacity building of early career researchers

The project aims to enhance the research capacity of Indigenous researchers by allocating substantial research time, engaging with the yarning activities, mentoring and supporting data analysis, and developing report writing skills. In addition, the Indigenous researcher will be supported by attending and presenting research findings at national and international conferences and contributing to scholarly publications. The project has recruited an Indigenous researcher to help expand the case study. Initially, one remote community was considered; however, with the addition of new personnel, the study now plans to conduct multiple case studies (at least two) in remote communities. This expansion will provide a deeper understanding of the challenges and opportunities in remote areas of Western Australia.

Linkages

No

Is this a cross-hub project?

No, but there is potential to collaborate in cross Hub activities when they occur.

Does this project contribute to a cross-cutting initiative?

No, but there is potential to collaborate in the Resilient Landscape cross cutting initiative potentially as the project progresses.

Indigenous consultation and engagement

IP5.04.01 is an assessment of Australia's material and waste flows at national, State and industry sector level. It does not consider socio-economic or cultural criteria in the analysis and hence does not specifically engage with or address Indigenous communities. There is strong demand for material flow and circular economy metrics within the policy community, and ensuring broad dissemination and effective communication of results will be a key focus of this project. The results of IP5.04.01 will be made available through the **Measuring What Matters** Framework of the Treasury and will contribute to the implementation of the **National Circular Economy Framework** and the work of the **DCCEEW Circular Economy Policy section**. Additionally, findings will be shared with all states and territories to support their measurement of circular economy progress. Results will be directly communicated and shared with research users at **DCCEEW, the Treasury, and state and territory governments**. All data will be made publicly available and will be presented in a **comprehensive report and a webinar**. It is hence classified as **Category 3 (Communicate)**. Furthermore, key findings will be published in **peer-reviewed literature**, presented at an **international conference**, and summarized in a **short video** to ensure accessibility to a wider audience.

IP5.02.03 in its current phase classifies as **Category 3 (Communicate)**. The current national scope of the survey means there is limited opportunity to engage in a meaningful way with Indigenous groups. We anticipate that the place-based case studies and pilots informed by the survey and data integration activities detailed in our plan, taking place in 2024-2025, will present opportunities to work with local Indigenous communities depending on the pilots chosen. This will depend on existing relationships and engagement held by local government bodies; however we look forward to sharing and applying the SCaW Indigenous engagement framework, tools and resources in how we work with local pilot partners to engage with local Indigenous communities. Note the team have all completed basic cultural awareness training and will continue to build our capabilities and stay abreast of SCaW Indigenous engagement developments in anticipation of higher levels of engagement with Indigenous partners in future activity. The initial database of regional initiatives will be shortlisted for case study development in late 2025. A consideration in prioritising case examples will be the presence and involvement of First Nations groups. Having shortlisted cases, we will be able to determine the lands on which detailed case study field work will take place, and begin to build relationships with First Nations groups in these areas. Recognising the short time frames and consultation fatigue of many groups, we will initially attempt to make contact through local case study partners where relationships exist, but also contact representative organisations directly. At a minimum, we will invite free, informed and culturally appropriate participation in activities, and ensure existing activities and reporting are included in case studies. Where appropriate, we will explore if yarning circles and similar methods are feasible and desirable to facilitate deeper dialogue.

IP5.02.04 is committed to a comprehensive and respectful approach to Indigenous consultation and engagement and to that end is considered a **Category 2 (Co-design)** project. From the outset, the project team, in close collaboration with the SCaW Hub's Senior Indigenous facilitator and an Indigenous researcher, will prioritize engagement with Aboriginal communities in Western Australia. The project will begin with a listening tour to identify interested communities willing to engage with the research. Local community champions will be identified, and a co-design process, guided by cultural respect and practices, will be fostered to ensure Indigenous voices are heard and represented at all

stages of the project. Consultation will be conducted in the first language wherever possible, ensuring accessibility and cultural sensitivity. The team will work collaboratively with Indigenous communities to describe waste management challenges and potential solutions, considering infrastructure, technologies, behaviour change, and capacity building. Throughout the research, the project will actively involve Indigenous communities through yarning circles, one-on-one yarning with community members, and other inclusive methods. These engagement activities will build on existing Indigenous knowledge about resource efficiency and circularity, allowing for the integration of traditional wisdom in addressing contemporary waste management issues.

The research will apply a co-design approach which involves multiple Indigenous communities and community representatives in Western Australia. Through a co-design process, we will ensure research is relevant and beneficial to Indigenous Australian communities and organisations by:

- Engaging with Indigenous communities and organizations from the early stages of the project to identify their needs, priorities, and aspirations related to waste management and resource recovery.
- Conducting co-design workshops, yarning circles, and other participatory activities to involve Indigenous stakeholders in shaping the research agenda, methodologies, and objectives.
- Respectfully listening to Indigenous voices, perspectives, and traditional knowledge, ensuring that research outcomes address their unique challenges and opportunities.
- Regularly seeking feedback and input from Indigenous stakeholders throughout the research process to ensure continuous alignment with their needs and expectations.

The rationale for the co-design process in the project lies in its adherence to the principles of genuine partnership and shared responsibility with Indigenous partners. This approach ensures that research is relevant and beneficial to Indigenous Australian communities and organizations by actively involving Indigenous voices in shaping the project's plan, objectives, and methodologies. The co-design process fosters opportunities for Indigenous peoples to engage in research and capacity-building, acknowledging shared benefits and promoting ethical practices such as obtaining free, prior, and informed consent and respecting Indigenous data sovereignty. Additionally, the project provides avenues for Indigenous employment and skill development, prioritizing Indigenous businesses in procurement and offering training to community-based researchers and volunteers. Effective communication and knowledge sharing with Indigenous stakeholders further enhance the co-design process's success in generating culturally appropriate and accessible research outcomes. The following action items will be considered as part of the codesign process to meet the co-design research objectives:

- Actively involve Indigenous researchers, scholars, and community members in the project team, fostering a diverse and inclusive research workforce.
- Provide scholarships, internships, or paid positions for Indigenous students, postgraduates, and community members to actively contribute to the research and gain valuable experience.
- Develop a research ethics framework that aligns with the AIATSIS Code of Ethics and other relevant guidelines, ensuring respect for Indigenous cultural protocols and consent procedures.

- Establish an Indigenous Advisory Committee or equivalent body to oversee and guide the research process, including project governance and decision-making.
- Facilitate knowledge exchange between Indigenous and non-Indigenous team members, fostering cultural awareness and mutual understanding.
- Utilize culturally appropriate and accessible communication methods to disseminate research findings, such as yarnning circles, community workshops, or visual storytelling.
- Undertake training in Indigenous cultural and intellectual property (ICIP) and cultural awareness (including localised cultural awareness provided by partnering Indigenous organisations).
- Produce plain-language summaries or multimedia resources to make research findings more easily understandable and relevant to Indigenous audiences.
- Foster ongoing engagement with Indigenous communities beyond the project's conclusion, nurturing long-term relationships based on trust and mutual respect

A summary of the Three-category approach that each project meets is as follows:

Project IP5.04.01	Indigenous-led <u>(1)</u>	Co-design <u>(2)</u>	Communicate <u>(3)</u>
	☐	☐	☒
Project IP5.02.03	Indigenous-led	Co-design	Communicate
	☐	☐	☒
Project IP5.02.04	Indigenous-led	Co-design	Communicate
	☐	☒	☐

Project milestones

Project IP5.04.01: Metrics, data and indicators for material flow and stocks, waste and emissions to monitor progress of Australia's circular economy transition

No.	Deliverables	Delivery Date	Responsible Person
IP5.04.01-D1	Workshop with the Department to discuss and agree the focus of the Australian Material Flow, Waste and Circularity Report	09/2024	Heinz Schandl
IP5.04.01-D2	Draft report shared with research-users of the Department and State governments.	01/01/2025	Heinz Schandl
IP5.04.01-D3	2025 Australian Material Flows, Waste and Circularity Report launch and presentation	28/02/2025	Heinz Schandl
IP5.04.01-D4	Publication of key results in a peer-reviewed journal	30/06/2025	Heinz Schandl
IP5.04.01-D5	Draft report shared with research users of DCCEEW and State governments.	28/02/2026	Heinz Schandl
IP5.04.01-D6	2026 Australian Material Flows, Waste and Circularity Report launch and presentation	30/04/2026	Heinz Schandl
IP5.04.01-D7	Publication of key results in a peer-reviewed journal	30/06/2026	Heinz Schandl
IP5.04.01-D8	Draft report shared with research users of DCCEEW and State governments.	01/11/2026	Heinz Schandl
IP5.04.01-D9	2027 Australian Material Flows, Waste and Circularity Report launch and presentation	01/12/2026	Heinz Schandl
IP5.04.01-D10	Publication of key results in a peer-reviewed journal	01/12/2026	Heinz Schandl

Project IP5.02.03 Governing community-based waste management and resource recovery and circular economy initiatives

No	Deliverables	Delivery Date	Responsible Person
IP5.02.03-D1	Survey deployment	Oct 2023	Stefan Kaufman
IP5.02.03-D2	Publication of three regional LGA in depth case studies	Nov 23	Stefan Kaufman
IP5.02.03-D2	Survey report and presentation at Circularity 2023	Nov 23	Stefan Kaufman
IP5.02.03-D4	Share results and launch online regional and remote LGA community (if additional funding secured, dashboard development then launch, recruit facilitator)	Oct 24	Stefan Kaufman
IP5.02.03-D5	Report - Generate socio-technical profile, research design and recruit trial participants	Dec 24	Stefan Kaufman
IP5.02.03-D6	Report - Case study database design and deployment	September 25	Stefan Kaufman
IP5.02.03-D7	Share learnings and resources from cases and trials via online community, publications, webinars and events	Nov 25	Stefan Kaufman

IP5.05 Waste Impact Management Research

IP5.02.03-D8	Report, dashboard (deploy and report case study and survey results and update socio-technical profile and online dashboards (pending third party funding)	June 26	Stefan Kaufman
IP5.02.03-D9	Summary report about generalisable insights from engagement and case research with regional councils for scaling up and scaling out in future activities at regional initiative level	December 2026	Stefan Kaufmann

Project IP5.02.04 Identifying opportunities from waste management and resource recovery and the circular economy for Indigenous communities and businesses

No.	Deliverables	Delivery date	Responsible Person
IP5.02.04-D1	Short summaries of outcomes of each yearning circle	ongoing until May 2024	Atiq Zaman
IP5.02.04-D2	Yarning circles (group discussion) on the identified waste management issues and presentation of research outcomes with the relevant community members will be conducted to seek feedback and suggestions.	May 2024	Atiq Zaman
IP5.02.04-D3	Yarning circles on waste management priorities and possible circular economy solutions	Feb 2025	Atiq Zaman
IP5.02.04-D4	Report on the community consultation and presentation to the participating Aboriginal communities for feedback and suggestions- Phase 1 and 2 report	May 2025	Atiq Zaman
IP5.02.04-D5	Tackle textile waste through co-designed workshop plan and evaluation report (participation, valued outcomes, requested skills/materials, operational requirements), plus feasibility recommendations for sustaining the workshop as a community-led initiative and adapting elements for remote contexts.	Dec 2026	Pia Interlandi & Roberto Minunno

Data and information management

All output of the research will be made freely and openly available as per the NESP data and information guidelines.

All reports will have a summary for a general audience and will be accessible on the Hub's webpage. Outreach meetings with research-users will ensure that scientific information can be translated to practically usable knowledge products that can guide decision making.

Datasets, metrics and indicators will be coordinated by the Hub's Data Wrangler and be initially stored in an intermediary data repository. The open access of datasets and of analytical tools used to generate data will be discussed with the Department to ensure the way data is shared contributes to the various data initiatives undertaken by the Department and the Australian Government more generally. The primary data concerning the exploration of waste-related opportunities within Aboriginal communities will be stored within Curtin University's repository, in accordance with the stipulations of ethics approval. Following discussions with the department and end-users, only coded or unidentifiable data will be made available in the public domain, ensuring the safeguarding of data privacy.

A dedicated NCRI facility for material flow and supply chain data will be explored with the NCRIS team.

Project output	Data management and accessibility
Metrics, data and indicators of Australia's material flows, recycling and circular economy (project IP5.04.01)	The information system will be set up to adhere to the principles of the data and information guidelines to ensure information is findable, accessible, interoperable and reusable. All data will be peer-reviewed.
Research report and peer-reviewed journal publications (activities 1-5)	All research outputs will be made open access
Analytical tools, modelling platforms, etc.	Analytical tools such as research questionnaires, analytical tools and models will be made available open source to the extent possible

Location of research

Research will be undertaken by researchers located across Australia and from the five core research partner institutions and additional research partners when required.

The proposed project is a national scale project. Outcomes will be used for setting the forward R&D agenda for the theme of the Hub. As such, the projects will have scaled benefits. It is also envisioned that the outcomes of this project will be used to inform the National Waste Policy and National Waste Policy Action Plan as well as industry and state and local government stakeholders.

The co-design process undertaken in RP2021 included research-users from urban, regional and remote Australia, and a range of government and industry agencies, and communities.

The activities identified during co-design are located at:

- National - A national level assessment developing metrics, data and indicators for waste management and resource recovery with geographical and sectoral detail (including global supply chains).
- In selected local government areas in remote and regional Australia, as indicated by the integrated survey and waste demographic portal assessment for the regional governance project, and by the willingness and ability of trial partners to participate, plus third-party funding, ideally.
- In the Whadjuk Noongar community (along with another Aboriginal communities in the remote area-yet to be confirmed) in Western Australia to explore circular economic opportunities for Indigenous businesses and communities

The findings for Western Australia, for communities in Victoria and Tasmania and Indigenous communities in Western Australia are expected to yield insights of significance for national decision making. The co-design process will continue to explore additional partnerships and impact pathways for the waste impact management research and will allow IP5 to contribute to the national footprint of the SCaW Hub.

At which spatial scale is the project working	National ☒	Regional ☒	Local ☒
Location(s) – gazetted region /place name	The Whadjuk Noongar community, Armadale City Council, Western Australia Previous RPs saw work in Launceston, Ballarat and Bendigo. Place based trials will be selected in LGAs in remote and regional Australia. Online community and survey will address LGAs across Australia, with a focus on remote and regional LGAs.		
Aboriginal or Torres Strait Islander nation or traditional place name(s)	The Whadjuk Noongar community in Armadale area (within Swan Canning Catchment) of Western Australia has been identified for the IP5.02.04 project. Remote and rural Aboriginal communities will be identified in a later phase of the project duration upon consultation with the Hub Indigenous Facilitator and interested community representatives of the Aboriginal communities.		

Project keywords

Sustainable materials management; circular economy; waste management and resource recovery; resource governance; industrial ecology.