

Plastic Research Network Australia

Facilitating collaboration, knowledge sharing and insight

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6 August 2024

Plastic pollution represents a pervasive challenge intricately linked to most facets of society, characterized by a wide array of material forms and complex local governance dilemmas. Effective mitigation requires a collaborative approach transcending traditional boundaries, incorporating collective efforts from Australian communities and international cooperation. CSIRO proposes to create a network of research institutions, Plastic Research Network Australia (PRNA), to govern collaborative information tools for plastic innovation in Australia.

A Directory of Plastic Research

The first tool for PRNA to oversee would be a directory of Plastic Research. The concept is based on the Hydrogen community's HyResearch (2024) directory. The directory is list of member projects, categorised by taxonomy and annotated with tags, narrowing down the area involved.

The directory would support:

- Identifying critical mass and gaps in plastic circular economy research which would support grant writing.
- Increase collaboration and interface building across adjacent circular economy stages.

CSIRO is seeking to convene a meeting to kick off the PRNA and identify scope and governance. Contact Gavin.Walker@csiro.au to participate.

A taxonomy of Plastic Circular Economy research

An example directory has been built using CSIRO PhD data. Easy navigation and statistical overview comes through classifications that mean something to the community. Table 1 shows the main fields including:

- A taxonomy of research focus areas was chosen from a plastic circular economy paper classification by King and Locock (2022). A common set of terms will make related activity easier to find.
- This was extended using unpublished analysis from Andrew Terhorst on the research areas in the circular economy more generally. Areas with low publications are valuable as they show new opportunities. A graphic representation is shown in figure 1.
- A set of tags to identify the type of plastic, area of application, geography and main collection source.

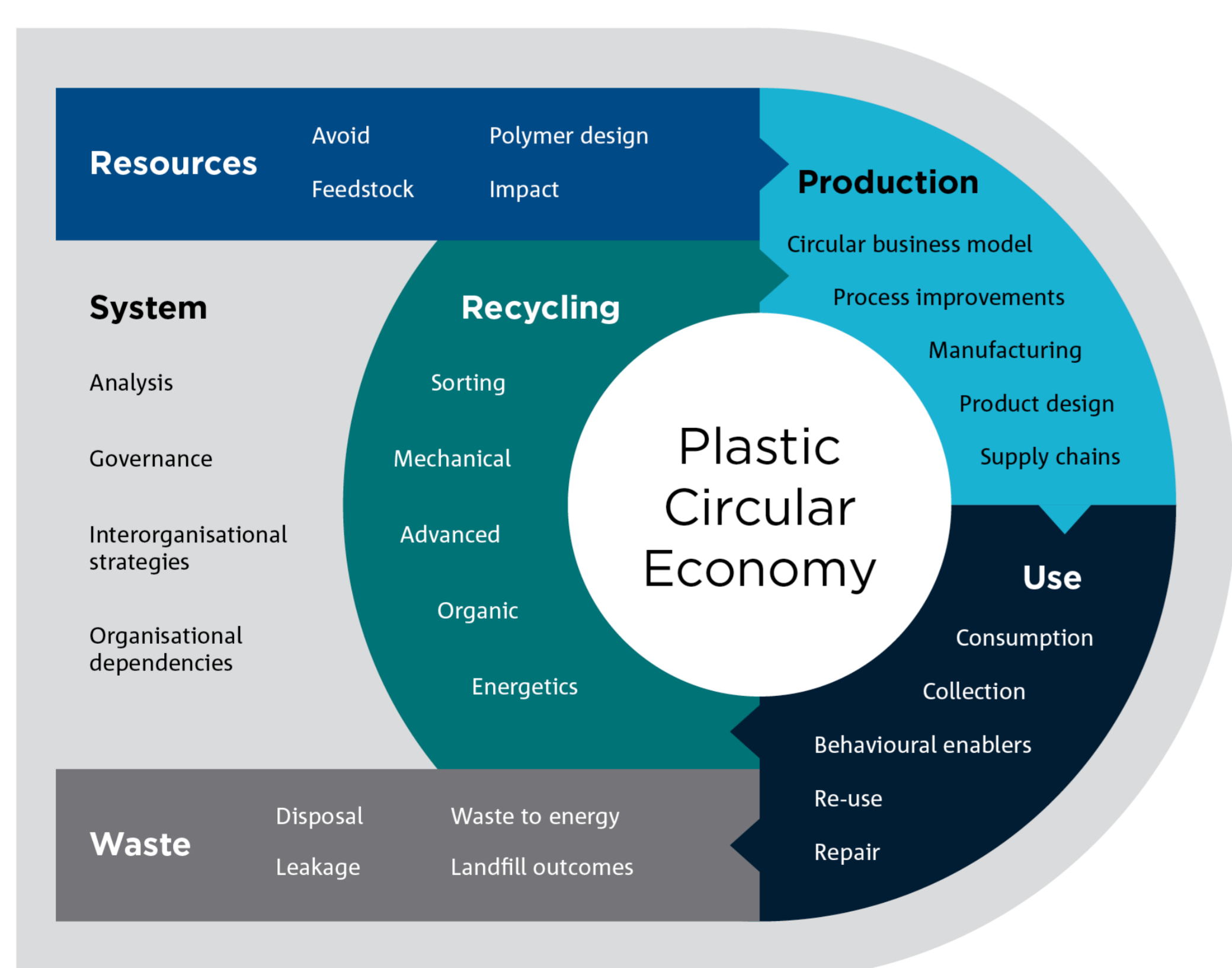


Figure 1: An infographic of a taxonomy of Plastic Circular Economy research areas. Derived from a taxonomy proposed by King and Locock (2022) from a semi-systematic literature review. It has been extended to balance the class sizes and better reflect research in the circular economy.

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FOR FURTHER INFORMATION

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REFERENCES

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HyResearch 2024 <https://research.csiro.au/hyresearch/>
RLA 2024 <https://researchlink.ardc.edu.au/>

ACKNOWLEDGEMENTS

Author would like to acknowledge the assistance of:
• Dr Deborah Lau for providing data, reviewing web site and funding development.
• Dr Andrew Terhorst for providing topical analysis of circular economy categories, from which new taxonomy elements were drawn.
• Dr Peter Grubnic for the permission to derive from HyResearch.

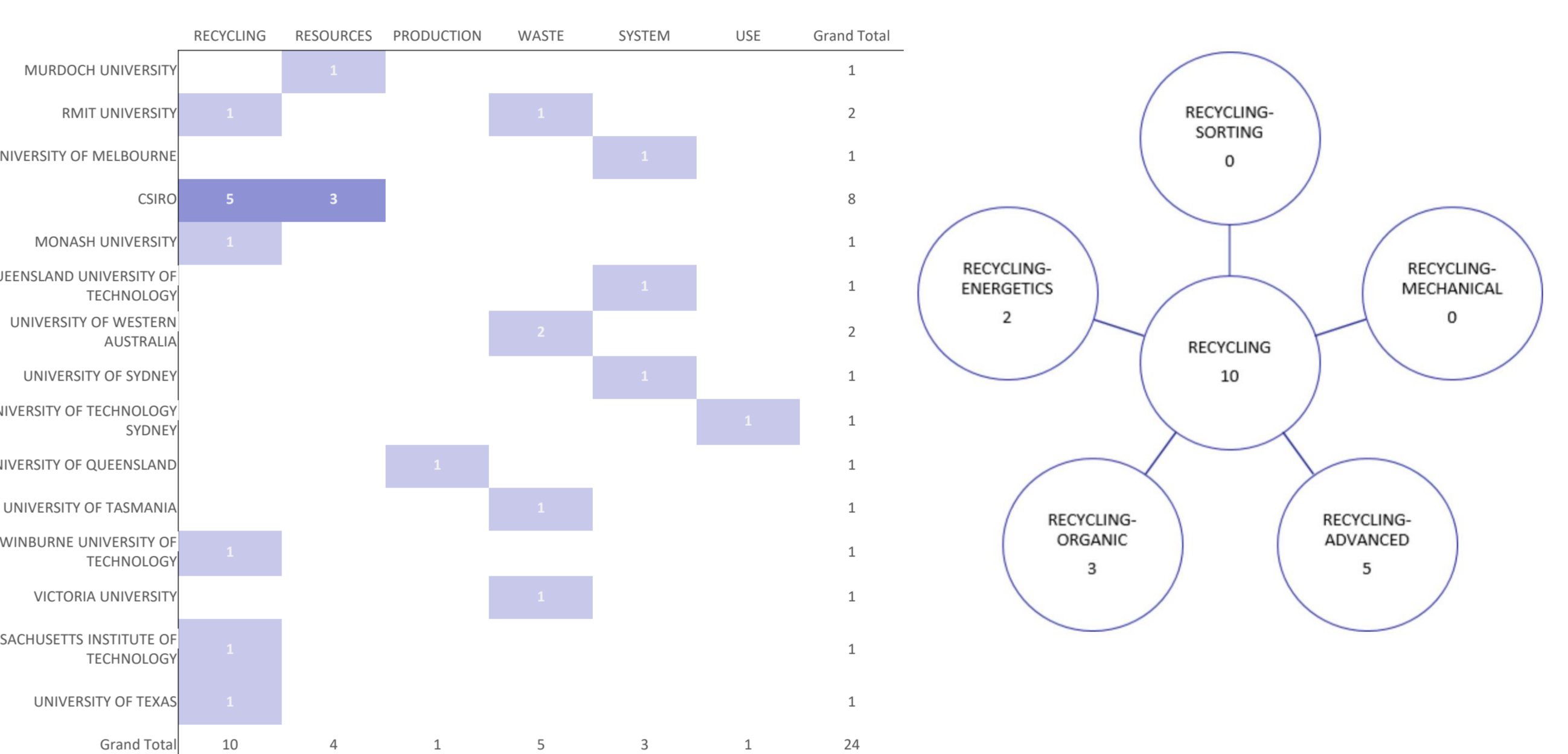


Figure 2: Heatmap (left) of projects on Plastic Research. The matrix shows the number of projects CSIRO has with specific Universities with a circular economy domain. In a more complete systems CSIRO would reflect its own research activity and universities would reflect theirs. Other visualisations derived from the data below are available including the star diagram (right) of recycling research focus areas.

Table 1: Summary Data would be available to search and download as a table. Each project would have its own web page with more detailed information. Projects are annotated with plastic circular economy research area and optional tags related to plastic type, source and application area. A subset is included below. Research Link Australia's (RLA 2024) new research listing could a source of data. It contains mostly Australian Research Council funded Discovery and Link projects. Using existing databases will reduce the cost of data acquisition.

PROJECT TITLE	R&D FOCUS AREAS	TAGS	TRL	LEAD ORGANISATION	STATUS	FUNDING PROGRAM	START DATE
Recyclable-by-design – thermoset polymers	Resources- Polymer Design	OTHER	2	CSIRO	Active	CERC Postdoctoral fellows – Research Office R+	
Smart Bin Tech PoC	Use- Collection	MSW		University Technology Sydney	Active	CSIRO Ending Plastic Waste	
Bioprospecting and bioremediation strategies for marine plastics	Waste- Leakage	Ocean		University of Western Australia	Active	Australian Research Council	
Separation of post-deconstruction monomers with membranes	Recycling- Advanced			Monash University	Active	Australian Research Council	Feb-23
LCA for best practice disposal of EPS marine and coastal debris from storm events	Waste- Leakage	PS;expanded ;Water edge		RMIT	Active	Australian Research Council	
Examining regulatory barriers to growing Australia's recycling industry	System- Governance			Queensland University of Technology	Active	Australian Research Council	Feb-23

A hub for capability visualisation

The example Plastic Research directory has visualisations of capability including:

- A heatmap of major plastic circular economy research areas identifying the project count in each area for each institution (Figure 2)
- An interactive heatmap to drill down to specific research focus areas.
- A set of star diagrams showing project count in a major and minor research focus areas (Recycling shown in Figure 2)
- A star diagram showing project count for each type of plastic derived from the tag information.

The directory could be augmented with links to data and data visualisations, such as DCCEEW's waste and resource recover data hub. It could also allow connections to tools, by members, that further explore research or data.

