

Growing the circular economy for plastics

Changing the way we design and use plastics to contribute to a circular economy and a cleaner, safer environment



The Solving Plastic Waste CRC will ensure that focused, industry-driven collaboration between the research sector, governments and the entire plastics value chain is effectively enabled over the next decade to transform the way plastic products are designed, manufactured, used, recovered, and recycled, and how microplastic soil pollution is remediated. This will be achieved by developing improved product designs, new materials, technologies, and processes, and by exploring new business models and economic systems.

It will accelerate Australia's progress towards its targets of eliminating plastic pollution, establishing a circular and climate neutral economy for plastics, and growing a competitive, sustainable advanced manufacturing sector.

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Why a Solving Plastic Waste CRC?

Achieving a circular economy for plastics in Australia will require profound change; in 2021 Australians used 3.8 million tonnes of plastics (152 kg per person), more than 40% were for single-use applications, only 12% of end-of-life plastics were recycled and 84% were sent to landfill.

It is widely acknowledged that the progress on solving the plastic waste problem nationally must accelerate and that greater collaboration between all the stakeholders is required.

In order to achieve Australia's national targets, the Solving Plastic Waste CRC will serve as an essential bridge between industry, researchers, and governments. This is enabled uniquely by the CRC model which fosters the long-term partnership required between these companies and the research sector to achieve high impact outcomes.

The Solving Plastic Waste CRC is focused on designing out plastic waste, supporting the transitions of companies in Australia's plastics value chain to a circular and climate neutral plastic economy by 2030, and growing advanced manufacturing. The plastic value chain is fundamental to advanced manufacturing, packaging, food and groceries, as well as the waste and resource recovery sector. Through its activities, the CRC will contribute to the global competitiveness, productivity, and sustainability of Australian industry.

It will deliver new jobs, skills and regional solutions by growing sustainable businesses and new markets, whilst creating a valuable circular economy for plastics resulting in a cleaner and safer environment.

Additionally, the CRC will play a critical role in providing all levels of government with independent evidence-based advice necessary to establish the regulatory and commercial environment for a circular economy.





The challenge of plastic waste pollution

Plastics are essential for producing many products used across most sectors of the global economy. However, the existing linear plastic value chain, where plastic products are designed for performance but not for recovery or reuse, is unsustainable with most of their economic value lost at end-of-life. The results are plastic waste pollution, a major environmental challenge of this century, and related concerns about the health risks posed by microplastics.

There is a global effort to eliminate plastic waste and create a circular economy for plastics. This has the commitment of the Australian Government which has joined the High Ambition Coalition with the goal of ending plastic pollution by 2040. Furthermore, all Australian Environment Ministers have agreed 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.

Links to Australian Government priorities

The CRC will address two of the National Reconstruction Fund priority areas: Value-added in resources, and Renewables and low emission technologies. Its research includes the Science and Research of advanced manufacturing, food, and soil and water.

The CRC will also support achieving the Australian Government's: National Plastics Plan; National Waste Action Plan targets; commitment to the High Ambition Coalition's goal of ending plastic pollution by 2040; and the New Plastics Economy Global Commitment to a circular economy for plastics.



Our partners

The Australian plastics value chain is complex, comprising a diverse array of upstream and downstream stakeholders of varying scale, sophistication and business interest. The partners relevant to the CRC bid span the entire plastic value chain and include: plastic manufacturers, plastic processors, major brand owners, recycling companies, relevant industry associations, and councils. They also include governments, industry bodies, non-government organisations, and universities.





Education and training (E&T) program

The E&T Program is an integral component of the CRC, enabled by a collaborative network of research partners across Australia, and a cross-section of industry partners that span the entire plastics value chain.

PhD Program

At the core of the E&T Program is a unique industry focused skills program aimed at developing the capabilities of PhD graduates and postdoctoral fellows to operate across the research-practice boundary. The Industry Doctoral Program will produce graduates able to access career pathways across the circular economy for plastics, in industry, research laboratories, or in academia while also providing postdoctoral fellows with enhanced and well-rounded industry engagement experience and skills.

Industry Development

The CRC will also offer micro-credentials (MCs) for industry managers and professionals aimed at building a deeper understanding of the upstream and downstream challenges and opportunities to develop solutions for plastic waste.

The E&T Program will be a fundamental legacy of the CRC, establishing an ongoing multi-disciplinary alumni network, strengthening Australia's circular economy research, and underpinning the skills and capabilities required in industry to develop, grow, and sustain a thriving circular economy for plastics.

Research Program 1: Materials and design to reduce products' environmental impact



This program will develop plastic compositions that are more easily recycled or composted, and product designs which eliminate their unnecessary use, enable their reuse, avoid problematic plastics and material complexity, and increase recycled content.



Indicative Key Outputs:

- Design guidelines considering alternative designs, material options and locally available end-of-life pathways, informed by regulatory constraints, user engagement and life cycle analysis, targeting an overall reduction in plastic waste.
- Improved product designs with optimal material selection, refined against a range of constraints, to achieve plastic circularity, low environmental impact, and consumer acceptance.
- Improved plastic formulations for use in products designed to be more easily sorted and recycled back into high value applications.
- Plastic composition with degradation properties that can be tailored to the rates required for their end-use applications and end-of-life disposal.

- Design guidelines for adoption by Australian companies seeking to redesign plastic products for reduced environmental impact.
- Pathways to commercialise redesigned products.
- Attractive material options for companies redesigning plastic products to enhance their end-of-life waste stream separation and recyclability and deliver more consistent recycled plastics of higher value over multiple life cycles.
- The development of sustainable packaging materials made from bio-derived polymers meeting municipal end-of-life collection and composting standards (ASTM 6500).

Proposed research programs

Research Program 2: Maximising the recovery and value of end-of-life plastics



This program will increase the recovery, sorting and recycling of plastics, maximising the value of the recyclates and expanding the markets for products that contain them. It will also enhance technologies for energy recovery from plastic waste.



Indicative Key Outputs:

- Insights and programs for improving the recovery and sorting of plastics prior to their collection.
- Technologies that improve the purity and value of sorted plastic pellets and flake for use in recycling operations.
- Improved designs for low-cost mechanical recycling extruders, mixed waste compositions for making non-structural timber substitutes, products that expand markets for recycled plastics.
- Understanding how to better control chemical recycling processes.
- Optimised conditions for operating a pyrolysis process.

- Programs to increase public participation in plastics recycling.
- Improved efficiency of sorting plastic waste.
- Establishment of remote recycling facilities using waste collected from remote and First Nations communities.
- Improved chemical recycling production processes.
- Improved efficiency of a pyrolysis facility.

Research Program 3: Implementing a circular economy for plastics in Australia



This program will scale the delivery of a carbon neutral circular economy for plastics by developing circular business models and markets, evidence-based policy advice and globally-informed strategies, underpinned by a robust evidence base for industry decision-making.



Indicative Key Outputs:

- Sectoral foresight reports and an online platform to understand the implications of how individual and widespread adoption of circular economic approaches interact across supply chains from agricultural plastic waste to medical waste and consumer packaging.
- Insights on business opportunities for a circular plastics economy, as well as the business ecosystem needed to support sector-specific innovation in business models and scaling up viable solutions.
- Policy insights and capacity-building guides enabling and incentivising circular design, sustainable consumption, and responsible products and materials stewardship, including via supply chain partnerships.
- Databases, economic calculators, online guides, benchmarking and reporting tools for companies and sectors to improve performance.

- Increased commitment and social licence for the adoption of circular plastics solutions and an awareness of path dependencies and the finance required for roll-out.
- Intelligence for programs accelerating circular economy business development.
- A policy framework to guide the establishment of a mature circular economy for plastics in Australia.
- Accelerated adoption of a carbon neutral circular economy.

Proposed research programs

Research Program 4: Mitigating the risk of microplastics in agricultural soils



This program will develop standardised methods to determine the sources, fate, and dispersion of microplastics in Australia's agricultural soils, examine the long-term risks to human and environmental health and provide effective mitigation strategies to reduce the transmission of microplastics to Australian soils.



Indicative Key Outputs:

- Standardised, specific methods for sample collection, isolation, identification and analysis of microplastics in agricultural soils and the body burden of livestock.
- An Australian data inventory (microplastic types, concentration, and composition) for the status of microplastic contamination in agricultural soils and products.
- Identification of the potential toxicity of microplastic pollution and its critical threshold values in soil, crops and livestock.
- Matrix specific technologies for the effective destruction/removal of microplastics from soil amendments prior to field application.
- Understanding the risk that microplastics in agricultural soils pose in terms of their persistent organic pollutant burden, and soil concentration compared with the predicted no effect concentration.

- Standard protocols for the collection, isolation, quantification, and characterisation of microplastics from soil.
- A database mapping soil microplastic hotspots around Australia
- Critical threshold values for microplastic in soil, crops, and livestock.
- Electrochemical, physical, and biological approaches to remove microplastics from supply chains, and mitigate microplastic soil contamination.
- Understanding of the human and ecosystem risk from microplastic-associated persistent organic pollutants.

Our people



Interim Chair Dr Leonie Walsh



Bid Leader and Interim CEO Dr Ian Dagley FTSE, FRACI, MAICD



Research Director Professor Dr Chengrong Chen Griffith University



Education and Training Lead

Deb Friel Central Queensland University



Research Program 1 Lead Professor Stefanie Feih Griffith University



Research Program 2 Lead Professor Minoo Naebe Deakin University



Research Program 3 Lead Professor Damien Giurco University of Technology Sydney



Research Program 4 Lead Distinguished Professor Andrew Ball RMIT University



What is a CRC?

The Cooperative Research Centre (CRC) Program is a Commonwealth Government program supporting industry, research and the community by providing grants for medium to long-term (< 10 years), industry-led research collaborations.

CRCs are independent entities, established and governed as incorporated companies limited by guarantee and comprise industry led collaborations between industry, researchers and the community.

The focus is on research and development that will have commercial uses. The CRC Program aims to improve the competitiveness, productivity and sustainability of Australian industries, especially in government priority areas, use high quality research to solve industry identified problems, and encourage SMEs to take part in collaborative research.

With more than 230 CRCs being funded since the program's commencement, the Australian Government has committed more than \$4.8B in CRC funding.

Solving Plastic Waste CRC Governance

The Solving Plastic Waste CRC will be established as a not-for-profit company limited by guarantee. It will be governed by a majority independent skillsbased board.

The Solving Plastic Waste CRC has a Term Sheet, developed in consultation with its partners, which further articulates the governance and management of the CRC and will form part of the package of information made available to prospective CRC partners.

Next steps

Our Stage 1 submission will be assessed over the next few months, with the announcement of those proposals selected to progress to Stage 2 due in June 2023.

In the meantime, we will continue to work with our partners in preparation for the next Stage. We welcome discussions with organisations interested in being partners in the CRC as we continue to prepare for the Round 24, Stage 2 bid submission.

Participating in the Solving Plastic Waste CRC

The Solving Plastic Waste CRC has three Partner categories, plus the potential to engage in CRC Projects under a Third-Party arrangement.

1. Core Partner	Cash contribution of \$200k and above per annum
2. Key Partner	Cash contribution of \$100k - \$199k per annum
3. Supporting Partner	Cash contribution of \$50k - \$99k per annum or a combination of cash and significant in-kind contributions which are deemed critical by the bid team for delivering project outcomes
Third Party	Typically providing in-kind contributions to specific projects

Third Parties and other interested organisations that are not Partners will have the opportunity to engage with the CRC as Associate Members, with benefits that include invitations to attend seminars and other networking events plus regular news updates and reports.

The high-level benefits associated with each Partner Tier and Third Parties are outlined below:

Tier	Core	Кеу	Supporting	Third-Party*
Membership of CRC Company	\checkmark	\checkmark	×	×
Nominate Board Members	\checkmark	\checkmark	\checkmark	×
Nominate a representative to Research Program Consultative Committees	\checkmark	\checkmark	×	×
Access to industry embedded PhD and Masters students and opportunity for co-supervision	\checkmark	\checkmark	×	×
Nominate projects	\checkmark	\checkmark	\checkmark	×
Discounted professional training and development	✓ (tailored)	✓	\checkmark	×
May be eligible for offsets under the R&D tax incentive	\checkmark	✓	\checkmark	×
Other benefits, including participation in CRC conferences, seminars and other networking events; regular news updates and reports	~	✓	\checkmark	✓

Timeline

Stage One applications closed on 7 March 2023, with the announcement of those proposals selected to progress to Stage 2 due in June 2023.



To find out how to become a participant in the Solving Plastic Waste CRC, or for more information, contact:

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