



A better approach

Pollution and hazardous waste are a significant risk to human and ecological health and a growing drain on the Australian economy, costing industry and government more than \$20 billion per year to clean up and manage. The Clean Australia Cooperative Research Centre (CRC) will deliver industry and government the knowledge and advanced technologies to dramatically improve the way we manage and eliminate pollution and waste. The CRC's work will better protect the health of people and the environment while unlocking economic growth and tens of thousands of new jobs in existing and emerging sectors.

The industry challenge

The landscape for dealing with pollution and hazardous waste has shifted rapidly in the last few years on three key fronts:

- Risk and clean-up challenges have grown because of a reduction in acceptable levels of exposure, an increasing number of persistent and potentially toxic emerging contaminants, and increased litigation
- The 2018 Chinese National Sword Policy banning waste imports and setting tougher standards for contamination has accelerated the transformation of the Australian waste management and recycling sector

- The groundbreaking capacity for artificial intelligence (AI) and machine learning (ML) to crunch massive datasets, automate environmental visualisation, and solve extremely complex problems with a speed and accuracy previously unimaginable.

Industry recognises the urgent need to transform the way Australia regulates and treats pollution and waste. The current approach is riddled with knowledge gaps, is slow and inefficient, and encourages and enables litigation. A step-change is required, and this can be achieved only through a long-term collaborative research effort co-designed by key end-user stakeholders – including owners and developers of land, the waste management and water sectors, recycling companies, environmental regulators and practitioners, community groups, and researchers.

In support of this need for transformational change, Clean Australia CRC partners have committed \$129.6 million (\$44.2 million cash, \$85.4 million in-kind).

The opportunity

The Clean Australia CRC's research program brings into play game-changing technological developments that did not exist even a decade ago. The end-user-led Clean Australia CRC comprises a new group of partners and a new remit to:

- Change the way we define and measure risk, safeguarding human and environmental health without imposing unnecessary limits on industry
- Reduce and better manage hazardous waste
- Harness new technologies to treat and recover value from waste and wastewater
- Better assess, regulate and treat complex and emerging contaminants (e.g. PFAS, pharmaceutical residues and micro/nanoplastics)
- Identify risks and commercial opportunities in waste and wastewater
- Apply AI, ML and data analytics to drive precision remediation and advanced waste management practices.

These industry-identified challenges and opportunities will be addressed through innovative world-first research.

Research programs

1. A New Paradigm for Managing Risk

- Creating a new model for risk that will provide better environmental, health and economic outcomes
- Establishing nationally consistent clean-up criteria for contamination and waste reuse
- Developing better ways to communicate with and engage communities.

2. Impact of Emerging Chemicals

- Understanding the exposure pathways of emerging and mixed contaminants
- Improving guidelines for the reuse of materials containing complex and emerging contaminants
- Ensuring human and ecological health in an evolving chemical environment.

3. Waste Management to Underpin the Circular Economy

- Providing high-quality data to inform better and more robust decisions
- Creating a blockchain-enabled material trading platform – which assigns accountability across the entire supply chain – for vastly more effective recycling
- Developing and using new technologies to treat, reduce and re-use waste.

4. Next-Generation Clean-up

- Utilising AI-enabled tools for faster, cheaper and more reliable planning and scoping of remediation
- Harnessing new technologies for assessing sites without subsurface investigations
- Developing technologies to treat emerging and complex mixed contaminants.

Education & training

The Clean Australia CRC's Education Program will foster the next generation of leaders in the environmental sector. The CRC will support a minimum 60 PhD candidates, who will work directly with

end users on real-world, industry-prioritised problems and enter the workforce 'industry-ready'. The CRC's Industry Training Program will disseminate research outcomes and the latest technical knowledge to build end-user skills and boost the professionalism and capacity of the waste management and remediation industries. Training, which will be delivered to at least 2,000 industry professionals via a range of platforms, will also have powerful potential as an international export.

Transformative economic benefits

The Clean Australia CRC is expected to create an additional \$1.7 billion in economic benefit to 2035 on a risk-adjusted basis, corresponding to a benefit cost ratio of almost 10:1 and Commonwealth funding leverage of 38 times.

These economic benefits will be derived through a combination of:

- Significantly reduced costs of regulation and management, including less waste to landfill
- Increased recycling of organic and construction waste and soil, including greater utilisation of biosolids and recycled wastewater
- Accelerating the release of high-value lands from derelict and brownfield sites
- Preserving clean water resources
- New technologies and export opportunities.

Why the Clean Australia CRC?



The CRC's R&D advances and economic impact will generate substantial spill-over benefits:

- A national cross-agency powerhouse that enables Australia to address its own critical waste and contamination issues and ensure a clean and prosperous future
- A platform for using critical data to underpin and drive the achievement of key components of Australia's National Waste Policy Action Plan targets
- Enhancing Australia's invaluable clean and green brand internationally
- Lower greenhouse gas emissions, and contributions to the science of climate change adaptation and the impact of bushfire-related pollution.

The Clean Australia CRC straddles health, the environment and our economy. As Australia faces perhaps its greatest ever economic challenge in response to the Covid-19 global pandemic, the CRC is ready to help accelerate an infrastructure- and construction-led reboot of our economy alongside a transformation of the waste management and recycling sector. These efforts will together generate thousands of new jobs and at the same time protect the health and wellbeing of Australians and our priceless environment for future generations.

CLEAN AUSTRALIA CRC PARTNERS

