

Submission to the NSW Department of Planning, Industry
and Environment

Cleaning Up Our Act: The Future for Waste and Resource Recovery in NSW

7 May 2020



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RESPONSE TO THE NEW SOUTH WALES 20 YEAR WASTE STRATEGY ISSUES PAPER

The Australian Academy of Technology and Engineering (ATSE)¹ welcomes the opportunity to respond to the issues paper 'Cleaning Up Our Act: The Future for Waste and Resource Recovery in NSW' to help shape the development of the 20-Year Waste Strategy.

ATSE is currently undertaking a major project investigating the readiness of the Australian waste management and resource recovery sector to adapt, adopt, or develop technologies that will enable it to meet key challenges it will face in the decade to 2030:

- Transition to waste as a resource
- Domestic capacity to process core waste, and
- Emerging waste streams

The project is focused on the opportunities presented by waste materials, and innovative solutions to these challenges.

ATSE's vision for the waste and resource recovery industry in 2030 includes the conversion of waste streams to income streams, with an expanding network of waste and recycling hubs, skilled jobs created in waste management and innovation, and more efficient supply chains and business opportunities in Australia's manufacturing sector. The Australian waste and resource recovery sector will be profitable, resilient and ready for the country's transition toward a more circular economy. We will maximize the use of resources and minimize waste. The waste sector will have reduced environmental impact through the diversion of waste from landfill, reduced resource depletion and reduced emissions, toxicity, and contamination.

ATSE commends the NSW Department of Planning, Industry and Environment on the development of this issues paper. Our objectives of addressing systems-level challenges and opportunities for the waste and resource recovery sector are closely aligned. ATSE seeks to broadly respond to the key directions identified in the issues paper.

Direction 1: Generate less waste

Question 1.2 How do we better design out waste?

Reducing waste generation is key to a sustainable waste and resource recovery sector in NSW. ATSE believes that there are many opportunities for NSW to support industry to design out materials which are complex to recycle, including multi-material plastics (as identified by the NSW EPA).²

NSW has strengths in circular design to reduce and re-use waste to produce value-added products. The work of NSW Circular Economy Innovation Network demonstrates how collaboration between academic, industry and government stakeholders can tackle complex issues to produce sustainable, technology-driven circular economy solutions.

¹ The Australian Academy of Technology and Engineering is a Learned Academy of independent, non-political experts helping Australians understand and use technology to solve complex problems. Bringing together Australia's leading thinkers in applied science, technology and engineering, ATSE provides impartial, practical and evidence-based advice on how to achieve sustainable solutions and advance prosperity.

² NSW Waste Sector Volume 1: Key Findings. 2019. NSW Environmental Protection Authority. <https://s3.ap-southeast-2.amazonaws.com/hdp.au.prod.app.nswdpiе-yoursay.files/5515/8277/7055/Key-Findings.pdf>

Further engagement of government and industry stakeholders with academic institutions undertaking advanced design and manufacturing of modular, low-waste materials and components will accelerate industry adoption of design solutions for their products.

Direction 2: Improve collection and sorting

Question 2.5 What are the key barriers to innovation in the waste and resource recovery sector?

ATSE supports the proposed application of innovation and ‘waste-tech’ to improve collection and sorting systems in NSW. Existing collection and sorting systems cause issues of contamination for some waste streams, impeding recycling and recovery of materials.

The waste and resource recovery sector has not yet experienced the technological disruption which has transformed other sectors. Governments and industry must consider the role of technology in meeting sustainable development goals using automation and smart technologies such as sensors, artificial intelligence, robotics and machine learning. The use of automation and advanced technologies may improve coordination of the collection, sorting and recycling of mixed municipal waste, and reduce contamination of recyclable waste. Optimising collection and sorting systems should be a priority for state governments and local governments, to improve system efficiency and to contribute to recycling targets. In order to develop strong and future-ready infrastructure, governments should promote diversity of technology and investigate new ownership models by considering the role of public, private and community stakeholders. Building community trust must remain a priority for NSW in developing fit-for-purpose and fit-for-future technologies and infrastructure.

ATSE understands that the main barriers to innovation in the waste and resource recovery sector are:

- Costs associated with operationalising new technologies and overhauling existing systems, processes and infrastructure
- Lack of sector stability to drive investment in innovation and technology
- Lack of interdisciplinary working and development of productive partnerships to develop innovative solutions
- Lack of community engagement with circular economy principles

All dimensions of waste management should be explored in order to produce innovative and viable collection and sorting solutions. The use of such advanced technologies to reduce contamination of waste streams and maximize the values of recovered goods presents an opportunity for NSW to gain value from waste streams and improve diversion of waste from landfill.

Direction 3: Plan for future infrastructure

Question 3.1 How can government and industry better encourage innovation in waste infrastructure, to ensure it is sustainable, adaptive and responsive over time?

On the current trajectory, NSW would need to significantly increase landfill capacity to manage growth in waste generation.³ Mapping and planning of critical waste infrastructure is key to managing the immediate challenges facing the sector in light of the impending waste export bans, which will see a ban on export of unprocessed glass by July 2020 and mixed plastics by July 2021.⁴

³ Waste. What future do we want for the NSW waste sector? (2019) NSW EPA. <https://s3.ap-southeast-2.amazonaws.com/hdp.au.prod.app.nswdpi-e-yoursay.files/2715/8277/6687/Foresight-Analysis.pdf>

⁴ Phasing out exports of waste plastic, paper, glass and tyres: Response strategy to implement the August 2019 agreement of the Council of Australian Government (2020) Council of Australian Governments. <https://www.coag.gov.au/sites/default/files/communique/phasing-out-waste-exports-response-strategy.pdf>

Government and industry have a role to play in planning and implementing adaptive and sustainable waste infrastructure which can facilitate the transition towards circular economy goals highlighted by the NSW EPA foresight analysis.⁵

ATSE believes that the development of technology-supported waste infrastructure may be the solution to ensuring adaptability and sustainability of the sector. An example of such technology is the recently announced CRC-P funded project led by NSW Smart Sensing Network to develop chemical sensor technology to detect contamination of plastic chips.⁶ The use of advanced sensing technologies can improve adaptability of existing infrastructure and should be considered when planning for future infrastructure as enablers towards circular economy objectives.

The waste and resource recovery sector is undergoing major changes and there will need to be a sector-wide approach to infrastructure investment. In order to meet sustainable development goals, all new infrastructure should be designed with key circular economy principles in mind.

Direction 4: Create end markets

Question 4.3 How can industry and government best work together to foster partnerships and address information barriers to the uptake of recycled materials?

As highlighted in the issues paper, NSW is currently not on track to meet 2021 landfill diversion targets for both commercial and industrial and household waste streams. The creation of viable end markets for recovered materials is an opportunity for the sector to drive domestic recycling and recovery rates.

ATSE supports the proposed Option 4.3 to match suppliers with markets. Services such as CSIRO's ASPIRE designed to match waste processors and manufacturers with markets for recycled products have been highly effective at creating relationships between stakeholders and improving information sharing. The digitisation of platforms to collect, collate and share data on waste supply, movement and recycling may improve manufacturing capacity and drive investment in waste activities. There are opportunities for NSW to leverage the understanding of waste generation and movement to identify opportunities for jobs, infrastructure, and investment.

Furthermore, the current COVID-19 crisis has thrown global supply chains into chaos, directly impacting domestic manufacturing. As Australian businesses rise to the challenge of pivoting existing manufacturing capabilities for the production of medical supplies without access to pre-existing global supply chains, there may be an increased demand for locally recycled materials such as plastic, textiles, and bioethanol. Given the strong manufacturing capabilities in NSW, there may be opportunities arising from this crisis to inject waste into the post-COVID economy and kickstart strong domestic supply chains and end-markets.

New South Wales has an opportunity to be a national role model in implementation of circular economy approaches to the waste and resource recovery sector. While there will be some challenges to implementing appropriate infrastructure for meeting circular economy objectives, there will be opportunities for NSW to address systems-level challenges using technology-based solutions.

⁵ Waste. What future do we want for the NSW waste sector? (2019) NSW EPA. <https://s3.ap-southeast-2.amazonaws.com/hdp.au.prod.app.nswdpie-yoursay.files/2715/8277/6687/Foresight-Analysis.pdf>

⁶ <https://www.nssn.org.au/news/2020/2/11/nssn-announces-15-million-project-to-deliver-smart-sensing-solutions-to-the-recycling-industry-1>

ASTE's Waste and Resource Recovery project

ASTE's current project is designed to inform the transition of the waste and resource recovery sector as it faces multiple disruptions in the next decade. The project is framed by the principles of the waste hierarchy: avoidance, reuse, recycle and recovery, treatment, containment and disposal.⁷



Source: EPA Victoria, State Government of Victoria

Based on advice from our Fellows and independent expert stakeholders, ATSE has identified four potential solutions to these challenges. Through consultations currently being undertaken with the industry, government and researchers, ATSE is assessing the industry's readiness to adopt, adapt or develop these solutions by 2030:

- **Improved product stewardship** where the consumer, manufacturers and the waste sector work together to reduce waste. Through business models such as product as service, sharing platforms⁸ and product life extension, manufacturers take responsibility for the environmental impacts of their products by maximizing the utility of assets via renting, lending, swapping, bartering and giving—facilitated by technology⁹.
- **Design for disassembly:** Products designed with disassembly in mind from the outset will enable industry to repair, repurpose and remanufacture them and recover valuable materials from them as they reach end of life. This requires a rethinking of the product design processes, to focus on separation of components, possibility of upgradation and exploring ways of combining the components to fit a new use (repurpose).
- **Smart waste management systems (for collection, disassembly, material recovery and processing):** These include intelligent systems for waste collection and management, improved sorting and separation of waste, recovery of valuable materials from waste. Advanced technologies can assist in minimizing the effects of contamination of waste streams and maximize the values of recovered goods. For instance, using technology to incentivize waste

⁷ Treatment, containment and disposal are excluded from the scope of the project

⁸ Accenture (2019), *Using digital tech to spin the circular economy*. Available online at: <https://www.accenture.com/au-en/insight-outlook-using-digital-tech-spin>

⁹ World Economic Forum (2014) *Towards the Circular Economy: Accelerating the scale-up across global supply chains*. Available online at : http://www3.weforum.org/docs/WEF_ENV_TowardsCircularEconomy_Report_2014.pdf

separation by consumers through a reward system¹⁰, 'Pay as you throw' systems¹¹ among others can bring a change in the way waste is created and disposed¹².

- **Advanced resource recovery solutions** that use technologies to recover energy to produce electricity, heat, gas and fuels from waste.

Further information

ATSE will be launching the report later in 2020 and would be pleased to brief the Department and learn more from the results of this inquiry.

For further information about this project, please feel welcome to contact Alix Ziebell, Director of Policy and Government Relations, Australian Academy of Technology and Engineering on (03) 9864 0909 or Alix.Ziebell@atse.org.au.

¹⁰ For instance, smart bins using RFID (radio frequency identification) tags to identify and track people's recycling habits

¹¹ Systems where the refuse collector scans and weighs the bins, records the information in a database, and then charges for the un-recycled waste

¹² [Can technology help tackle the world's waste crisis](#)