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17 December 2022

Committee Secretary
Standing Committee on Climate Change, Energy, Environment and Water
PO Box 6021
Canberra ACT 2600

Dear Sir/Madam

Re: Inquiry into plastic pollution in Australia's oceans and waterways

Engineers Australia is the peak body for the engineering profession in Australia. We are a professional association with over 115,000 individual members, constituted by Royal Charter to advance the science and practice of engineering for the benefit of the community. Our members represent every discipline of engineering and work across all sectors of the economy impacting the lives of Australians every day.

Engineers Australia welcomes the opportunity to submit a response into the *Inquiry into plastic pollution in Australia's oceans and waterways*. Plastic pollution is of course more widespread than in aquatic ecosystems alone however it is in marine environments that the effect of plastic pollution is most widely observed. Overall, the issue requires an appreciation of the incredible engineering utility synthetic polymers provides to our society coupled with an understanding of the scale and severity of current risks to human and ecosystem health and biodiversity.

Long chain polymers from fossil fuels are strong, lightweight, flexible¹ and cheap to produce. They have become integrated into almost every aspect of modern society and are globally ubiquitous.² Under current production rates, the use of plastics could almost triple globally by 2060, with plastic waste also set to triple; 50% of which ending in landfill and less than 20% recycled. Plastic leakage to the environment is expected to double and plastics in aquatic environments will more than triple.³

Recent studies have confirmed the presence of microplastics at global average levels in extremely remote parts of the Southern hemisphere⁴. It has also been estimated that humans may ingest between 0.1-5 g of microplastics weekly through various exposure pathways.⁵

The impacts of macro-plastics in ecosystems have been widely documented, with substantial evidence showing the outcome of processes involving ingestions, entanglement, and habitat damage. It is impact

¹ *The History and Future of Plastics*, <https://www.sciencehistory.org/the-history-and-future-of-plastics>

² *Climate Impact of Plastics*, Helmcke S, Hundertmark T, Musso C, Ong W J, Oxgaard J, Wallach J, McKinsey & Company, July 2022. <https://www.mckinsey.com/-/media/mckinsey/industries/chemicals/our%20insights/climate%20impact%20of%20plastics/climate-impact-of-plastics-v2.pdf?shouldIndex=false>

³ OECD (2022), *Global Plastics Outlook: Policy Scenarios to 2060*, OECD Publishing, Paris, <https://doi.org/10.1787/aa1edf33-en>.

⁴ *Around The Plastic World In 455 Days, A Citizen Science Global Transect Quantifying Microplastics In The Oceans*. Scarlett A G, Lintern GM, Copeland A D, Sanders J, Davis S and Grice K. 2022, Curtin University.

⁵ *Estimation of the mass of microplastics ingested - A pivotal first step towards human health risk assessment*. Kala Senathirajah K, Attwood S, Bhagwat G, Carbery M, Wilson S, Palanisami T. <https://pubmed.ncbi.nlm.nih.gov/33130380/>



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of microscopic and nanoscopic plastics that require greater research and assessment. In particular, the transfer of toxic compounds either from the release of components of the plastic itself or by concentrating and releasing pollutants found in the surrounding environment. It has even been demonstrated that plastic particles can carry pathogenic species.⁶

Informed risk assessments as a basis for research and engineering innovation will be a key measure of improving the circularity of plastics in our society, whilst avoiding its presence in ecosystems, our food chains and ultimately ourselves. In achieving this, Australia requires a policy framework that provides market incentives and effective regulations to ensure the adoption of circular economy principles.

Table 1.0 summarises Australia's state and territory bans on single use plastics. While it is clear efforts are being made, it is also clear inconsistency exists across jurisdictions, especially Tasmania's lack of progress. Overall, most States and Territories have or are proposing to have a ban on approximately two-thirds of common use plastics. It is worth noting that the remaining one-third include some of the most widely produced items such as fruit and vegetable produce bags, plastic cups/coffee cups/lids and plastic take-away containers, and so further attention needs to be drawn to these items for an effective single use ban to be nationally effective.

By means of example, California has recently introduced legislation that prohibits food service packaging that is not reusable, recyclable, or compostable in State-owned facilities. It further imposes a tax through a producer responsibility program which aims to shift the burden of costs to collect, process, and recycle single use packaging materials from local jurisdictions to the producers of plastic products. Importantly, where recycling is cost-prohibitive, the onus is on the plastic producer to eliminate, re-design or substitute packaging materials.⁷

Further, it is noted this Inquiry is a timely contribution in the lead up to Australia's commitment to the United Nations Environment Assembly's (UNEA) *Global Plastics Treaty*, in which UN Member States have unanimously agreed to develop a legally binding treaty to end plastic pollution. Engineers Australia is an accredited observer to UNEA and is actively participating in the Intergovernmental Negotiating Committee's (INC) stakeholder discussions. The treaty responds to recent trends in plastics use, waste, and leakage to the environment as being a global issue that will require individual governments to coordinate a national approach in ensuring both environmental impacts and prevention measures are adequately developed and managed.

⁶ *Plastic pollution impacts on marine carbon biogeochemistry*, Environmental Pollution, Volume 268, Part A, Galgani L, Loisel S A., 2021, 115598, ISSN 0269-7491, <https://doi.org/10.1016/j.envpol.2020.115598>

⁷ California Legislative Information, Senate Bill No. 54, Solid Waste: reporting, packaging and plastic food service ware. https://leginfo.ca.gov/faces/billNavClient.xhtml?bill_id=202120220SB54

Table 1.0 Australian State and Territory Bans on Single Use Plastics.⁸

Item	ACT	NSW	NT	QLD	SA	TAS	VIC	WA
Lightweight plastic bags	Current	Current	Current	Current	Current	Current	Current	Current
Straws	Current	Current	2025	Current	Current		2023	Current
Drink stirrers	Current	Current	2025	Current	Current		2023	Current
Cutlery	Current	Current	2025	Current	Current		2023	Current
Polystyrene food + drink containers	Current	Current	2025	Current	Current		2023	Current
Plates + bowls	2023	Current	2025	Current	2023		2023	Current
Cotton bud sticks	Current	Current		2023	2023		2023	2023
Microbeads	2023	Current	2025	2023				2023
Heavyweight plastic bags	2023		2025	2023	2024			Current
Fruit + veggie produce bags					2024			2023
Plastic cups + lids					2024			Current
Coffee cups containing plastic					2024			2023
Helium balloons			2025					
Plastic takeaway containers	2023				2024			

Key: Current means a ban currently in place, Blue means a ban is in place but yet to commence according to year, Orange means a ban is proposed and subject to consultation according to year, Blank represents no current or planned ban.

At a Commonwealth level, the *National Plastics Plan* provides a platform to move towards a circular economy with commitments to reducing plastic waste, increasing recycling, finding plastic alternatives, and reducing the impact of plastics in the environment.⁹ While Engineers Australia supports the plan, and endorses the option to bring in legislation to ensure Australia takes responsibility for its plastic waste, there are some specific opportunities that require mention:

1. Negotiate State and Territory alignment on single use bans for all common use plastics, as a means of ensuring a consistent national approach. Single use bans are only as good as the least performing State or Territory, particularly when it comes to marine environments that are subject to global currents, meaning plastic waste can travel vast distances.
2. Amend the handling and storage classification of ‘nurdles’ to ‘Dangerous Goods’. Presently, the pre-production building blocks or nurdles that are used to manufacture a significant volume of plastics are un-regulated. These building blocks are typically very small (1-5mm) are considered microplastics. It is estimated that 10 trillion nurdles infiltrate marine ecosystems around the world each year.¹⁰ Shipping accidents aside, the lax handling and storage regulations in

⁸ Australian Marine Conservation Society, November 2022. <https://www.marineconservation.org.au/which-australian-states-are-banning-single-use-plastics/>

⁹ National Plastics Plan, 2021, Department of Agriculture, Water and the Environment.

¹⁰ The massive unregulated source of plastic you’ve probably never heard of. Vox. May, 2022. <https://www.vox.com/recode/23056251/nurdles-plastic-pollution-ocean-microplastics>

Australia lends itself to unnecessary plastics pollution. Stricter controls must be introduced to ensure minimisation of nurdle leakage to the environment.

3. Incentivise the rapid introduction of microfibre filters for both grey (outgoing) and clean (incoming) water for residential and commercial sites. The *National Plastics Plan* proposes to work with textile and whitegoods sectors on an industry-led approach to the introduction of microfibre filters in washing machines by 2030. Engineers Australia believes this is too little, too late and only addresses one half of the issue. Having microfibre filters on both incoming and outgoing water supplies will mitigate risks for both ecosystem and human health alike.

Leading on from the *National Plastics Plan*, Engineers Australia supports a regulatory framework that both incentivises and ensures continued research, innovation, and manufacturing of a range of fit for purpose plastics in Australia. It is imperative that technological innovations in both design and process, focus on plastic avoidance, material substitution, product longevity (repair/reuse) and waste minimisation opportunities. Specifically:

- Supporting technology innovation through partnerships: In complementing the work of the CSIRO, the Commonwealth Government is well placed to support partnerships and collaborations between industry, research centres and universities as a basis for scientific and engineering research. Engineers Australia would welcome input into any opportunity to build connections in this regard.
- Significantly ramp up research and development in methods that:
 - Build and share knowledge; particularly on human health and ecosystem risks.
 - Break down plastics to usable molecules for material re-use.
 - Create economically viable substitutes for plastics with biodegradable alternatives.
 - Technology pathways to mitigating, managing, and utilising advanced recycling methods including Artificial Intelligence and advanced robotics to aid sorting and processing procedures remains central to achieving more responsible environmental outcomes and an enhanced circularity of plastics production and use.
 - Mechanically, biologically and/or chemically remove plastics from ecosystems in a safe manner.

Lastly, Engineers Australia strongly supports the Commonwealth Government's role in providing education and leadership in efforts to positively influence consumer behaviour in the use and recycling of plastics. There are numerous opportunities to contribute to community campaigns that help monitor and control plastic pollution. Of note below are some regarded citizen science initiatives and community groups:

- [Ausmap](#)
- [Beach Patrol](#)



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- [Litter Stopper](#)
- [Operation Clean Sweep](#)

It is vital to connect such initiatives with academic or industry-based research as a means of ensuring high quality and effective community-based plastic pollution control and study methods, as well as potential funding opportunities.

Engineers Australia remains at the ready to engage in all future consultations process on what is a critically important socio- and enviro engineering matter; the talents of applied scientists across all engineering disciplines, and especially chemical engineers, need to be at the forefront of the Government's discussions, responses and future decision-making.

Please do not hesitate to reach out if you would like clarification or to discuss anything further. You can contact [Simon Koger, Senior Policy Adviser, Climate Change at skoger@engineersaustralia.org.au](mailto:skoger@engineersaustralia.org.au).

Sincerely yours

Damian Ogden

Group Executive, Policy and Public Affairs



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APPENDIX A: TERMS OF REFERENCE.

The House of Representatives Standing Committee on Climate Change, Energy, Environment and Water will inquire into and report on the impact of plastic pollution, including microplastics, with regard to:

- the environmental impacts of plastic pollution particularly in oceans and waterways
- the effectiveness of Australia's plastics management framework under the National Plastics Plan and related policies to reduce plastic pollution particularly in oceans and waterways
- the effectiveness of the Australian Government's engagement with states, territories, industry and non-government organisations to reduce plastic pollution particularly in oceans and waterways
- the effectiveness of community campaigns to reduce plastic pollution particularly in oceans and waterways and encourage the use of alternative materials
- global initiatives underway to reduce plastic pollution particularly in oceans and waterways, and
- any other relevant matter.