



31 January 2020

The Hon Barnaby Joyce MP
Standing Committee on Industry, Innovation, Science and Resources
PO Box 6021, Parliament House
Canberra ACT 2600

Dear Mr Joyce

The Australian Local Government Association (ALGA) is pleased to provide this submission to the Standing Committee on Industry, Innovation, Science and Resources for the purposes of its Inquiry into Innovative Solutions in Australia's Waste Management and Recycling Industries.

Local government plays a critical role in Australia's waste and resource recovery system and as such should be considered a key stakeholder in this consultation process. ALGA is the national voice of local government in Australia, representing 537 councils across the country. In structure, ALGA is a federation of state and territory local government associations. ALGA was established in 1947 and throughout its history has been closely involved in issues of national significance affecting the local government sector as a whole.

This submission should be considered in conjunction with any submission made by State/Territory Associations and individual local councils.

ALGA was a co-author of the National Waste Strategy 2018 (with states and territories and the Australian Government), which aims to address an Australian 'waste crisis'. Australia's recycling rate is below that of most OECD countries, with around 40% of Australian waste being landfilled. The shortcomings in Australian waste management weigh particularly heavily on local government. Around 26% of Australian waste is Municipal Solid Waste (MSW) managed by Australia's 537 local councils. Local government receives no financial contribution from the manufacturers of the products from which the waste arises and which consumers have little choice but to buy. Collecting, treating and disposing of Australian MSW costs local government a conservatively estimated \$3.5 billion annually.

Recommendations

To address the waste crisis and its iniquitous impact on local government, major opportunities for structural innovation must be recognised and acted on. These include:

1. establishing new product stewardship projects;
2. investing in infrastructure capacity and capability;
3. creating new markets for products containing recycled material; and
4. developing educational programs.

To benefit from these opportunities, a number of major impediments must be addressed. These include:

1. thin markets and market failure;
2. lack of standards;
3. lack of government and private sector procurement;
4. lack of data, research and development, and national coordination;
5. lack of transparency between local governments and waste businesses; and
6. lack of financing and funding.

Despite the challenges, local government is pioneering innovative responses to the waste crisis. These address different aspects of the Australian waste crisis, from waste avoidance to infrastructure capacity, to the creation of new markets and education. The case studies provided here might be rolled out elsewhere or provide useful lessons to other waste stakeholders more broadly. They include projects that:

1. improve domestic kerbside waste separation;
2. promote retail waste avoidance;
3. provide guidelines for procurement of products with recycled content;
4. reduce waste sent to landfill;
5. convert waste to energy; and
6. reduce waste entering waterways.

The rationale for each of these recommendations is outlined under the response to the Terms of Reference in the attached submission.

Please contact Bethune Carmichael at bethune.carmichael@alga.asn.au if you would like to discuss this submission further.

Yours sincerely



Adrian Beresford-Wylie
Chief Executive



AUSTRALIAN
LOCAL GOVERNMENT
ASSOCIATION

Submission to the Senate Standing Committee on Industry, Innovation, Science and Resources

In response to the inquiry into innovative solutions in Australia's waste management and recycling industries

31 January 2020

Response to the Terms of Reference

This submission comprises the following three sections:

Section A is a **problem statement**. Before exploring opportunities and impediments for innovative solutions for waste and recycling, it is important to first define the problem requiring the solution. Not doing so would run the risk of nominating solutions disconnected from systemic needs and not open to evaluation against relevant baselines. The section therefore describes Australia's current 'waste crisis', and in particular its disproportionate impact on local government.

Section B discusses the **opportunities** that the current crisis presents.

Section C explores the subsequent **impediments** to realising these opportunities.

Section D documents **innovative solutions** to the waste crisis that are currently being developed by the local government sector. These are exciting responses emerging at the coalface of waste management; they can provide useful lessons to other waste stakeholders.

A. Problem statement

The Australian Local Government Association (ALGA) was a co-author of the *National Waste Strategy 2018* (with states and territories and the Australian Government). The Strategy and its implementation plan, the *National Waste Action Plan (2020)*, aim to address what has been widely described as an Australian 'waste crisis'¹.

Australia's recycling rate is below that of most OECD countries, with around 40% of Australian waste being landfilled. In the last decade, the amount of waste generated in Australia has increased by around 12%². While a significant proportion of Australian waste is being shipped overseas for recycling, offshore waste markets are rapidly contracting, and prices for recovered material have slumped. A major Victorian waste processor has recently gone into receivership (SKM), and waste collected and sorted for recycling is often hazardedly stockpiled or even rediverted back to landfill³. At the same time, a significant proportion of Australia's waste finds its way into waterways and oceans as a result of littering and illegal dumping. It is estimated the world's oceans contain 150 Mt of plastic waste⁴.

The *National Waste Strategy* and its *Action Plan* are responses to a growing awareness among Australians of these problems, and the widespread desire for a sustainable, coordinated response. The Strategy and Plan therefore point the way to developing a more 'circular economy', in which better waste management leads to a greater recovery of valued resources, creates jobs, protects fragile ecosystems and reaps economic rewards. Indeed, modelling by the Centre for International Economics estimates a 5% increase in the efficient use of materials could add \$24 billion to Australia's GDP⁵.

¹ Australian Parliament, Environment and Communications References Committee, 2018, *Never Waste a Crisis: the Waste and Recycling Industry in Australia*

² Blue Environment, 2018, *National Waste Report*

³ Randell Environmental Consulting et al, 2017, *Hazardous Waste Stockpiling in Australia*

⁴ Australian Government, 2018, *National Waste Strategy*

⁵ Centre for International economics, 2017, *Final Report*

The impact of the problem on local government

ALGA's involvement in the framing of the Strategy and Action Plan is important because the shortcomings in Australian waste management weigh particularly heavily on local government.

Around 26% of Australian waste is Municipal Solid Waste (MSW) managed by Australia's 537 local councils. Local government receives no financial contribution from the manufacturers of the products from which the waste arises and which consumers have little choice but to buy. Product stewardship is nascent in Australia⁶, and there are no regulations requiring manufacturers to produce less packaging or make it more easily recycled. Local government must bear the cost within the context of greatly diminished general funding from the Commonwealth, rate capping in some jurisdictions and the need to provide a plethora of other local, community services and infrastructure. Furthermore, the waste levies that local government are charged by the states (which are aimed at making recycling more cost effective) amount to over \$800 million per annum nationally⁷. Next to none of this sum, however, is reinvested in the capacity and capability of recycling infrastructure, which would assist local government in avoiding the levies. Waste levies, as they are currently managed, have little potential to drive further improvements to the recycling rate.

The cost of recovering MSW is onerous. Collecting, treating and disposing of Australian MSW costs local government a conservatively estimated \$3.5 billion annually⁸. Unlike other streams of waste, MSW comprises a complex mix of waste types, and needs to be recovered weekly from individual homes safely and hygienically. The large variety of household waste materials and the large proportion that is currently not able to be recycled means kerbside recycling bins are highly 'contaminated', or contain significant amounts of unrecoverable content. This represents a great challenge to the sorting of recycled materials at MRFs. Capability shortfalls at MRFs mean that their output is largely mixed paper and mixed plastics. These mixed products are the least valued by Australian recyclers, who source almost exclusively from cleaner, commercial and industrial streams⁹. As a result, waste sorted by MRFs for recycling makes up the lion's share of waste exports¹⁰. It is therefore likely that Australia's impending National Waste Export Ban will result in more waste going to landfill and greater land fill management costs. It has been estimated that the cost to local government and Australian households of the ban will be an extra \$45 per year for additional landfill costs and lost export revenue. This amounts to \$416 million per year across Australia¹¹.

To address the waste crisis and its iniquitous impact on local government, a number of major opportunities for structural innovation must be recognised and acted on.

⁶ Corporate Waste Solutions, 2017, *Is Australia's Product Stewardship Act Effective?*
<https://www.fmmedia.com.au/sectors/australias-product-stewardship-effective/>

⁷ NRIC, 2019, *Waste Levies White Paper*

⁸ ABS 2016-17 *Waste Account Australia, Experimental Estimates*. Over \$14 billion is spent annually on waste collection treatment and disposal; and according to the *National Waste Report 2018* (p8) MSW comprises 26% of Australian core waste.

⁹ Industry Edge, 2019, *Assessment of Australian paper & paperboard recycling infrastructure*

¹⁰ Envisage Works, 2019, *Plastics infrastructure analysis update*

¹¹ Centre for International Economics, 2019, *Microeconomic analysis of waste industry supply chains*. p2

B. Opportunities created by the waste crisis

The Australian waste crisis creates a number of opportunities. This section will discuss:

- 1) establishing new product stewardship projects;
- 2) investing in infrastructure capacity and capability;
- 3) creating new markets for products containing recycled material; and
- 4) developing educational programs.

1) Establishing new product stewardship projects

Opportunities for innovative waste solutions should not be exclusively focussed on the end of the waste chain. The *National Waste Strategy* focuses on developing a circular economy, which involves seeking opportunities from energy-and-resource-efficient material cycles. These cycles begin with the initial input of energy and resources. Introducing mandatory product stewardship with targets aimed at reducing the waste built into products in the first instance creates a level playing field for all manufacturers. In this way, mandatory targets would create the opportunity to innovate for lower impact products. The early progress made to date by the voluntary program managed by the Australian Packaging Covenant Organisation (APCO) is encouraging, but APCO's targets need to be more ambitious. Furthermore, the *National Environment Protection (Used Packaging Materials) Measure 2011* needs strengthening to ensure all industry brands are obligated to join the APCO scheme, as there remain many free-riders. The *Australasian Recycling Label* being developed by APCO should also be made mandatory for all packaging. Mandatory product stewardship in general needs extending to other areas, such as batteries, tyres, photovoltaic systems, electrical products (additional to computers and TVs), energy storage batteries, handheld batteries, plastic oil containers, and microbeads. Container deposit schemes (CDS) and plastic bag schemes need to be rolled out nationally; and CDS extended across a much larger range of plastic packaging (i.e., not just beverage containers). Broadening CDS would solve multiple problems associated with kerbside collection. It would drive standardisation of packaging, greater industry membership of APCO, and reduce kerbside contamination.

2) Investing in infrastructure capacity and capability

Most of Australia's MRFs lack the technical capacity to sort co-mingled, highly contaminated MSW into a broad range of material types that have low levels of contamination¹². Having this capacity would provide the opportunity to access a greater variety of markets.

Kerbside collection is also underdeveloped. Only 10 local councils provide kerbside collection for all types of recyclable plastics. While organic waste is a significant component in MSW, 58% of households have no collection service for food or garden waste¹³.

¹² Department of the Environment and Energy, 2018, *Analysis of Australia's municipal recycling infrastructure capacity*.

¹³ Department of the Environment and Energy, 2018, *Analysis of Australia's municipal recycling infrastructure capacity*.

The potential opportunities arising from addressing these issues are significant. For plastics, estimates of the net benefit of expanding sorting and processing infrastructure amount to \$312 per tonne, and improvements could potentially divert 110,000 tonnes from landfill annually generating \$34 million. New infrastructure for the chemical recovery of plastic polymers could divert 40,000 tonnes of soft plastics from landfill. For paper, estimates of the net benefit of expanding sorting and processing infrastructure amount to \$287 per tonne, and could potentially divert 370,000 tonnes from landfill¹⁴. Food waste results in very large quantities of imbedded energy being lost and emissions generated¹⁵; a significant opportunity exists to recover organic waste for use in agriculture.

3) *Creating new markets for products containing recycled material*

Investing in new infrastructure is not economical unless there is market demand for the resulting recycled material. It is important that governments do not act to increase the supply of recycled materials before there are domestic end markets for it. The potential closure of export markets will require dramatic increases in the use of recycled materials within Australia in order to absorb the 1.8 million tonnes of paper, plastic, glass and tyre waste currently recycled overseas. More dramatic increases in demand, however, are needed to reduce the 5.2 million tonnes landfilled with or without a ban¹⁶. Economies of scale would be achieved if the aim was to absorb all landfilled waste and not just the quantum currently exported for recycling.

Recycling markets have worked much more effectively when they are developed by those seeking material for use (such as VISY and Orora for paper). Therefore, to kickstart demand and an initial 'pull-through' for recycled materials, governments at all levels should mandate ambitious, public-sector procurement targets for products containing recycled content. Large private sector purchasers should be mandated to do the same. Local government is prepared to change its procurement guidelines in this regard, but will need financial assistance to do so. Regulations requiring manufacturers to use a certain percentage of recycled material should also be mandated, or a levy placed on the use of virgin material introduced. Without such regulatory intervention, there is no likelihood of the required markets developing, given the differences between commodity prices for recovered and virgin materials¹⁷.

4) *Developing educational programs*

Behaviour change is fundamental to addressing low recycling rates and contamination. The large variety of household waste materials and the large proportion that is currently not able to be recycled means correctly using kerbside recycling bins is challenging. Addressing this complexity at the beginning of the waste production chain has been discussed above, as has the introduction of the ARL. However, even with these reforms, there will still be a need to increase household understanding of the optimal use of recycling bins. Well designed and delivered programs might reduce contamination at source, making sorting and recovery for markets more efficient. Food waste is a particularly challenging issue. In 2016-17 some 4.3 Mt of food waste was generated with 87% going to landfill.

¹⁴ Centre for International Economics, 2019, *Microeconomic analysis of waste industry supply chains*

¹⁵ Food Innovation Australia Limited, 2019, National Food Waste Strategy

¹⁶ Centre for International Economics, 2019, *Microeconomic analysis of waste industry supply chains*

¹⁷ Envisage Works, 2019, *Recovered Resources Market Bulletin: October 2019, Victorian Market Intelligence Pilot Project* p14-15

Domestic food waste accounts for 34% of the total food waste¹⁸. Programs advising on minimising domestic food waste by avoiding over purchasing, planning appropriate meal-portion-sizes and the incorporation of uneaten food into subsequent meals would be particularly valuable.

C. Impediments to innovative solutions

Opportunities arising from the waste crisis face a number of major impediments. These include:

- 1) thin markets and market failure;
- 2) lack of standards;
- 3) lack of government and private sector procurement;
- 4) lack of data, research and development, and national coordination;
- 5) lack of transparency between local governments and waste businesses; and
- 6) lack of financing and funding.

1) Thin markets and market failure

Geographical distance and regional population sparsity work against solutions to Australia's waste crisis. This is particularly the case in outback NT, Queensland and Western Australia. The cost of transporting recovered waste to markets or to reprocessing plants can be onerous. In Western Australia, where there are no reprocessing plants for paper and plastics, shipping recovered waste overseas represents a lower cost than haulage to plants in the eastern states. Low population means market forces work against the viability of regional reprocessing plants and technical upgrades to sorting infrastructure. However, most rural and regional areas have no kerbside recycling services, and all waste is landfilled. Outback Australia would particularly benefit from regulatory schemes that require producers to pay for the cost of recycling, such as through remuneration for packaging recovery costs, container deposit schemes or other product stewardship schemes.

2) Lack of standards

The development of a broad range of new standards for products with recycled content is needed to support new markets for recovered material. For example, using tyre crumbs, soft plastics, printer cartridges and glass in new road bases, pavements and construction is hampered by a lack of standards. Without standards, concerns around safety and liability impede innovation. US and European standards may not be applicable to Australian conditions. New standards, however, take time and funds to develop. The amount of funds required are greater if trials are expedited.

3) Lack of government and private sector sustainable procurement

Ambitious procurement targets would help initiate new markets. Examples include requiring major new government transport projects to incorporate a given percentage of recycled material in road surfaces.

¹⁸ Blue Environment, 2018, *National Waste Report* p34

4) Lack of data, research and development, and national coordination

Research into the costs and benefits of new infrastructure and its most appropriate location is fundamental. Research can give confidence to the recycling industry's willingness to invest in new plant. National coordination and planning, based on hard data and sound peer-reviewed analysis, would ensure that there is no duplication of resources and that benefits flow equitably to both metropolitan and regional populations.

5) Lack of transparency between local governments and waste businesses

Contracting arrangements between local councils and waste businesses can be protracted, start from a position of a low level of trust and be based on limited information and transparency. There is a need for collaborative procurement of kerbside recycling services, aimed at enhancing competition and attracting new investment in recycling.

6) Lack of financing and funding

Financing is needed to seed-fund infrastructure development and to incentivise markets. Many of the targets set out in the *National Waste Action Plan* need urgent backing given the Waste Ban timetable. While changes have recently been made by the Australian Government to the mandate of the Clean Energy Finance Corporation, which allow it to provide affordable loans to waste industry investors, this is unlikely to be sufficient.

D. Innovative solutions being pioneered by local government

Local government is pioneering innovative responses to the waste crisis. Below are brief descriptions of case studies that might be rolled out elsewhere or provide useful lessons to other waste stakeholders more broadly. They address different aspects of the Australian waste crisis, from waste avoidance to infrastructure capacity, to the creation of new markets and education. Innovative solutions documented here include those that are aimed at:

- 1) improving domestic kerbside waste separation;
- 2) promoting retail waste avoidance;
- 3) providing guidelines for procurement of products with recycled content;
- 4) reducing waste sent to landfill;
- 5) converting waste to energy; and
- 6) reducing waste entering waterways.

1) Improving domestic kerbside waste separation

Projects include: improving kerbside recovery, providing educational programs, developing household smart phone apps, and providing community recycling centres and waste pick up services.

- Using Garden Bins to also Collect Food Waste

Maribyrnong, Surf Coast city/shire councils Victoria

With almost half the contents of a household garbage bin being food or garden waste, there is enormous opportunity to collect and reprocess this resource in order to add value to soils in agricultural production systems. These projects allow the participating councils to divert 28,000 tonnes of organic material. Surf Coast Shire Council have been trialling the use of existing garden bins to also collect food waste across 3,000 households in Anglesea, which has seen a significant 24 per cent reduction in waste being sent to landfill.

- Separate Glass Collection

Warrnambool, Yarra, Macedon Ranges city/shire councils, Victoria

Shards and small pieces of glass can become embedded in paper and cardboard in recycling bins, and contaminate the other recyclables. Both Macedon Ranges, Warrnambool City Council and Yarra City Council are separating glass from the kerbside commingled recycling bin, in the absence of a Victorian CDS. Macedon's new 140 litre glass-only bins will be collected every four weeks and have purple lids. Warrnambool Shire Council has received overwhelming public support for a separate recycling bin for glass. These projects will allow the participating councils to divert 4,600 tonnes of glass from landfill each year.

- Education Program – 'Rediscovery Centre'

Cairns Regional Council, Queensland

Cairns Regional Council offers schools and community groups guided tours of its Waste & Resource Recovery facilities, including the Materials Recovery Facility (MRF), Advanced Resource Recovery Facility (ARRF) and Buy Back Shop. Along the way, participants get a behind the scenes look at each step of the recycling sorting process, from the receipt of recyclables into the MRF, right through to the bailing of products ready to be transported to market. A dedicated education room called the 'Rediscovery Centre' offers an air-conditioned, safe, birds-eye view of the MRF processing plant. The Council also offers the following educational fact sheets and resources:

- *Our recycling story* – a detailed description of recycling in the Cairns Region.
- *Recycle right* – a website advising which items can be recycled and in which bin.
- *Recycling your waste around the house* – how / why reduce waste in wheelie bins.
- *Reuse to reduce waste* – how to reuse items instead of throwing them away.
- *Contaminated recycling* – how hazardous waste can be harmful and dangerous.
- *Sorting out the silly season* – recycling during the Christmas and New Year period.

- Education Program – ‘Recycle Night? Recycle Right!’

Riverina Eastern Regional Organisation of Councils, NSW

The Riverina Eastern Regional Organisation of Councils designed a campaign to humanise the recycling process. Recycle Night? Recycle Right! tells the stories of the people who work at material recovery facilities, the impact contamination has on their work environment and encourages residents to recycle right as their actions matter.

- Bin and Recycling Application

Brisbane City Council, Queensland

The app helps ratepayers stay up to date with bin collection days, and makes recycling decisions quick and simple. It includes: an alphabetical list of materials, with information on how to recycle or dispose of them; recycling tips and myths; push notifications about upcoming kerbside collection services and free tipping days.

- Community Recycling Centres

Riverina Eastern Regional Organisation of Councils, NSW

All Centres collect low toxic, problem wastes such as paint, oil, batteries, gas cylinders, smoke detectors and fluorescent tubes. The Centres are free for residents to use with the EPA covering the cost of the collection and disposal of the materials.

- The Mobile Community Recycling Service

Cumberland Council, NSW

The service involves the collection of problem wastes from local residents in the Parramatta and Cumberland local government areas. Since the service commenced over 2,500 bookings have resulted in 85,000 kilograms of problem waste being collected from local residents and processed to the highest resource value.

- Multi-Unit Dwelling (MUD) Recycling Program

Waverley Council, NSW

Waverley Council has worked closely with strata managers and residents in 803 units across 41 buildings to improve bin infrastructure and service design in addition to providing clear instructions on how to recycle correctly. Innovations include the creation of a template Strata Waste By-Law and reusable bags for residents to store and transport recyclables.

2) Promoting retail waste solutions

Projects include: waste avoidance for away-from-home consumers, and development of municipal infrastructure.

- ‘Tap – Great Taste, Less Waste’

City of Wagga Wagga, NSW

The program aims to better inform Riverina residents and visitors of the benefits of choosing tap water over bottled water, by promotion of reusable personal water bottles, reusable café style bottles for restaurants, and through the installation of water fountains and refill stations at two prominent Wagga locations. A free screening of the film *Tapped* was held to celebrate National Water Week, which documents the impacts of the bottled water industry.

- ‘Get Rid of it Right’

Waverley Council, NSW

The *Get Rid of it Right* project targeted actions for real estate agents, strata, property managers and various community sectors. Improving knowledge on disposing unwanted items correctly and promoting existing council waste services, strengthening and leveraging enforcement patrols and street beautification activities reduced illegal dumping by 48%.

- ‘All Eyes on Blacktown’

Blacktown City Council, NSW

Like many areas, Blacktown City had a visual litter problem along the major arterial roads. With the assistance of a NSW EPA grant, Council's interventions at eight fast food outlets along 13 arterial roads and targeted enforcement led to an 82% reduction in litter in the project area. In 2017-18, a total of 2,400 tonnes of rubbish was removed from areas in Canterbury-Bankstown.

- ‘Better Business Partnership’

Ku-ring-gai, North Sydney and Willoughby City, NSW

The Better Business Partnership's “Bye-Bye Plastic Hello BYO” is a behavioural change program targeting businesses and shoppers to reduce single use plastic items and encouraging the uptake of reusable BYO alternatives for common items bags, drink bottles, coffee cups, straws, cutlery, take away containers.

3) Providing guidelines for procurement of products with recycled content

Projects include: developing and initiating sustainable procurement pathways, and signing local government procurement MoUs to support local circular economies.

- Sustainable Procurement in Australian Local Government

Australian Local Government Association

The research project investigates current sustainable procurement guidelines used by local governments in terms of their alignment with circular economy principles. Ideally, procurement guidelines will underwrite procurement of products with recycled content. The research finds there are shortfalls in current guidelines and identifies ways to improve them. It does so by assessing them against European sustainable procurement guidelines. The research forms the basis for improved future guidelines. Such guidelines will contribute to the development of a circular economy at the local level, and support creation of new markets for products with recycled content.

- Framework for Regional Procurement

Southern Sydney Regional Organisation of Councils, NSW

The 11 member councils have unanimously signed a memorandum of understanding, which sets out how they will work together to develop a framework for regional procurement of recycled material in infrastructure.

- Circular Procurement Pilot Project

Local Government Association of South Australian – Adelaide Hills Council, City of Burnside, City of Charles Sturt, Mount Barker District Council, Rural City of Murray Bridge, City of Norwood Payneham & St Peters, City of Onkaparinga, City of Port Adelaide Enfield and City of Prospect.

In an Australian-first, nine South Australian councils have signed a memorandum of understanding to prioritise the purchase of products made from recycled materials. The aims to increase local demand for recycled materials, support the development of a circular economy in SA and reduce waste and recycling costs for councils.

4) Reducing waste sent to landfills

Projects include: using recovered plastic, rubber and glass in municipal works, and composting organic waste.

- Using Recovered Plastics and Glass in Footpaths

Wyndham City Council, Victoria

The Council has partnered with Swinburne University for a trial that explores the potential of using recycled plastics and glass in the aggregate materials for concrete footpath construction. The concrete was laid in early March 2019 at Geddes Crescent Reserve in Hoppers Crossing, and a research team from Swinburne will now monitor the concrete and conduct tests on samples collected. With Wyndham's population growing at a rapid rate, the amount of waste and recyclables coming out of households is also increasing.

- Using Recycled Glass in Road Base

Lockhart Shire Council, NSW

Lockhart Shire Council blends recycled glass with Council's own quarry materials for road construction projects. Using recycled glass is extending the life of the quarries by 5-7 years as well as using the stockpile of crushed glass at the local MRF. Council also uses the recycled glass in footpath and stormwater construction reducing the need to purchase sand materials.

- Using Recovered Plastics in Road Construction

Lake Macquarie City Council, NSW

Plastic bags, recycled glass and printer toner will be used in the construction of new Hunter roads as part of a \$5 million overhaul of Downer's asphalt plant in Teralba, Lake Macquarie. The site has the ability to process thousands of tonnes each year of sustainable road and pavement materials for the Hunter Region and Central Coast. The facility is one of the most advanced of its kind in Australia, capable of producing a wide range of products including asphalt containing recycled tyre rubber and Reconophalt, an innovative asphalt product that contains high recycled content from materials such as soft plastics, glass, toner and reclaimed road. Every kilometre of two-lane road made with Reconophalt contains the equivalent of 530,000 plastic bags, 168,000 glass bottles and 12,500 toner cartridges.

- Using Recovered Crumb Rubber in Road Construction

Mitcham, Port Adelaide Enfield, Campbelltown, West Torrens, Onkaparinga and Salisbury councils, South Australia

Six South Australian Councils have agreed to take part in a ground-breaking trial using crumb rubber derived from end of life truck tyres in roads. The agreement is between Tyre Stewardship Australia (TSA), Topcoat Asphalt Contractors Pty. Ltd. (Topcoat Asphalt) and the six councils. The Department of Planning, Transport and Infrastructure (DPTI) is providing technical advice and is interested in the trial results. TSA has provided funding for the project which will see a special gap graded asphalt modified with crumb rubber replacing regular asphalt on a number of roads.

- Food Waste Composting

Lake Macquarie City Council, NSW

Lake Macquarie City Council have taken a significant step in the war against waste with the opening of a state-of-the-art organics processing facility at the Awaba Waste Management Facility. The multi-million-dollar facility is the centre piece of the council's new three-bin waste management system, which will reduce the amount of waste going to landfill by as much as one third.

- Lounge Processing Trial

Shoalhaven City Council, NSW

A trial was undertaken with Shoalhaven City Council to see how long it would take to accumulate 300 lounges and then to assess the best way to break them down and divert them from the landfill stream. The lounges were either brought in by residents to one of 3 facilities or collected through the booked green and bulky collection. The 300 lounges were collected in just over a 3-week period with no advertising. Processing the lounges with a shredder and then compaction meant that the 300m² of lounges were converted into 19m² which allowed the lounges to be transported and diverted from landfill by converting them into an engineered fuel alternative. The trial showed that there are great opportunities for bulky waste diversion from landfill. Through future work the Council hopes to explore innovative solutions to other problem wastes.

- Nappies Added to FOGO Bins

Bega Valley Shire Council, Tasmania

Fifty families from across the Bega Valley are part of a trial to test if compostable nappies and incontinence products can be added to the shire's FOGO (Food Organics Garden Organics) bin collection service. Bega Valley Shire Council's waste team are leading the trial with Tasmanian-based compostable nappy manufacturer Eenee. The trial is in response to concerns families with young children raised when the red (landfill) bin collection service changed from weekly to fortnightly. The Environment Protection Authority is supporting the project in recognition that the trial has potential to address a major landfill issue facing councils Australia-wide. The South Australian government's Zero Waste SA estimates about 800 million disposable nappies end up in Australian landfills every year - a huge problem not only for Bega's landfill, but for landfills everywhere.

- 'Operation Nappy'

Wollongong City Council, NSW

Operation Nappy aims to reduce the number of disposable nappies entering landfill by changing the behaviour of new and expectant parents. Participants learn about the environmental, financial and health benefits of cloth nappies and are given a free cloth nappy. Based on the post survey data it is estimated that 5,475 disposable nappies per baby will be diverted from landfill by those using cloth nappies full time, and 3,650 for part-time usage.

5) Converting waste to energy

Projects mostly involve capturing landfill methane emissions for use in electricity generation. Note that such schemes are not in line with principles of a circular economy. Combustion generates CO₂ emissions. Ideally, avoiding the creation of organic waste in the first instance is preferable, or composting it.

- Capture and Combustion of Landfill Gas

Gladstone Regional Council, Queensland (Banaraby Landfill Biogas-fired generator); Eastern Metropolitan Regional Council, WA (Red Hill Waste Management Facility); City of Darwin, NT (Shoal Bay Renewable Energy Facility); Hobart City Council, Tasmania (McRobies Gully Landfill)

Council landfill-gas-to-energy projects exist in every state and territory.

6) Reducing waste entering waterways

Projects include filtering drains, introducing floating litter collectors and better outdoor-event management.

- ‘Let’s Strain the Drains’

Maribyrnong City Council, Victoria

The project will see litter traps installed in stormwater drains, which are monitored every six weeks to collect data on the quantity and types of litter accumulated. This data will then be compared to that of neighbouring Council’s involved in the project, enabling the source of the litter to be identified and actions taken to prevent these types of litter from entering waterways.

- Seabins

The City of Melbourne, Victoria

Five Seabins have been installed at Yarra’s Edge Marina following a successful trial in 2019. They collect up to 200kg of litter each day, including rubbish, oil, fuel and detergents. A Seabin is the size of a domestic rubbish bin and works like a pool skimmer. It floats on the water’s surface and collects litter using an underwater pump. Melbourne’s lord mayor Sally Capp says that an estimated 1.4 billion pieces of rubbish flow into Port Phillip Bay from the Yarra and Maribyrnong rivers each year. Food wrappers, cigarette butts, polystyrene, plastic bottles and rubber are some of the items that have been collected in the Seabins at Docklands. Seabin technology coupled with prevention has a significant role to play in reducing the amount of floating waste entering oceans.

- Single Use Plastics By-Law

Hobart City Council, Tasmania

The Hobart City Council voted on 4 March 2019 to pass a single-use plastics by-law, aiming to restrict the use of single-use plastic takeaway food packaging. It was the first capital city to do so in Australia. The Council has produced an information pack to assist businesses that may be impacted by the by-law, and provide information and resources, including:

- *a copy of the single-use plastic by-law*
- *a fact sheet on the Single-Use Plastic By-law*
- *a Frequently Asked Questions sheet*
- *a detailed list of alternative products currently available to be supplied in Hobart*
- *a calculator for businesses to quantify impacts of the by-law*

- 'Plastic Wise'

City of Darwin, Northern Territory

City of Darwin has made changes to the types of disposable items that can be used at events on council land and at Darwin's markets. These changes have been implemented to reduce the amount of single use plastic used and protect Darwin's unique environment, including marine and freshwater natural resources.

- 'Turning the Tide on Plastic'

City of Rockhampton, Queensland

From May 2019, all city operations, events and permits to trade within the City will be required to comply with the Single Use Plastic and Balloons Council Policy. The policy provides controls that minimise the adverse impacts of these disposable materials on the environment, particularly marine wildlife.

- Free Portable Water Stations

MacKay Regional Council, Queensland

Council has free portable water stations for community groups to use at their events. Council is providing these stations to reduce the amount of single-use plastic water bottles in the environment. The portable water stations are great for school, sporting and indoor and outdoor events.

- 'Butt Free Byron Shire'

Byron Shire Council, NSW

Litter monitoring found that 82% of the ground litter in the Byron Shire was smoking related. Council formed an alliance with local community groups to spread awareness, installed 128 new cigarette bins, implemented a smoking ban on all beaches and undertook enforcement and monitoring. A 78% decrease in cigarette litter was achieved.

- 'We Care Eurobodalla'

Eurobodalla Shire Council, NSW

Monitoring data revealed that Batemans Bay CBD was contributing a large amount of street litter so rather than let that flow out to sea and then pick it up in clean-up activities the council maintenance team installed baskets in the street drains, called Drain Buddies, to catch litter in the drains before it enters the estuary. Data collection from both the drain buddies and Local Litter Checks identified that amongst the top litter items collected were single-use takeaway plastics, such as straws, coffee cups, take-away containers, cutlery and bags. As a result, the *We Care Eurobodalla* program was developed to engage food-outlet business owners and their customers to CARE: Carry, Avoid single use plastic items, Reuse and Encourage others to do the same. Instead of focusing on making sure that rubbish was disposed of correctly or cleaned up, the council wanted to stop the rubbish being generated in the first place.

- 'Solar Smart Bins Trial'

Randwick City Council, NSW

The La Perouse Loop is a busy coastal area during summer and weekends, overlooking Frenchman's Bay. The objectives of the trial are to prevent overflowing bins and to reduce litter in the surrounding pristine environment. Three solar smart bins were installed. This has resulted in over 40% reduction in litter, and bin servicing has reduced from 21 collections to 2 collections per week.