

Roadmap to Implement the National Phase Out of Business-to-Consumer EPS Packaging

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Disclaimer

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At a Glance

Use the links on this page to be taken directly to the related section of this document.

- The Federal Government has marked some formats of business-to-consumer EPS packaging for phase out by the end of 2022, as these formats have been identified as problematic and unnecessary single-use plastics.
- Industry has already taken action to replace some of these business-to-consumer EPS packaging items with other materials. This roadmap builds on those existing initiatives to accelerate the phase out and aims to define a nationally consistent approach on EPS packaging.
- [Different types of EPS packaging and their environmental issues.](#)
- [Challenges in phasing out business-to-consumer EPS packaging.](#)
- [Examples of what businesses are already doing to phase out the use of EPS packaging through Elimination, Reuse and Recycling.](#)
- [Categories of EPS packaging and different approaches to delivering the national phase out of business-to-consumer EPS.](#)
- [Strategies and actions, responsibilities and timeframes to which APCO and industry commit.](#)
- [A summary table of feedback from industry associations and companies about EPS packaging which informed this roadmap.](#)
- [Definitions for terms used in this document.](#)

Introduction

This roadmap for expanded polystyrene (EPS) sets out a voluntary, industry-led approach to address the environmental impacts associated with business to consumer EPS packaging in Australia. The roadmap has been developed to meet expectations of governments and other stakeholders set out in:

The National Plastics Plan phase out of business-to-consumer EPS.

The Minister's Priority List under the Recycling and Waste Reduction Action 2020.

The **2025 National Packaging Target** to phase out problematic and unnecessary single-use plastic packaging.

The scope of the roadmap includes the following EPS packaging:



EPS loose fill consumer packaging:

- Used for consumer product protection in freight, for example peanut shaped loose foam packaging.



EPS moulded consumer packaging:

- Used for consumer products.
- Protective packaging for white/brown goods and electronics, including but not limited to computers, TVs, printers, fridges, toasters, furniture and homewares.



EPS food & beverage consumer containers:

- Single-use hot and cold cups, tubs, bowls, plates, and clamshells for food service.

Strong, collaborative action has already been taken by industry leaders in the food, beverage, electrical, electronics, furniture and retail sectors to replace business-to-consumer EPS with more sustainable alternatives that can be more easily recycled. This roadmap sets out actions and timeframes to build on these early initiatives.

During consultation for the development of the roadmap, a range of complex supply chain considerations were identified that impact the initial timeline and approach described in the National Plastics Plan. Specifically, while the National Plastics Plan timeframes are on track for EPS loose-fill and food and beverage consumer containers, certain EPS moulded consumer packaging applications were unable to be phased out by the National Plastics Plan timeframe of July 2022 – those with longer product cycles beyond 2022 where packaging has already been designed and manufactured, and those where no viable alternative to EPS is currently available. To address these issues and ensure a robust approach, industry has designed the EPS roadmap activities for moulded consumer packaging to be delivered in phases.

Industry has already initiated a significant amount of work towards phasing out these materials to meet the targets of 80% phase out by July 2023, 90% phase out by July 2024, and 100% phase out by July 2025. For consumer packaging that has no viable alternative at present, industry will introduce a robust product stewardship scheme that is easily accessible to consumers to help them recycle EPS by December 2024. The roadmap describes a strategy for delivering actions over an agreed timeline to ensure that the required changes can be effectively implemented and deliver positive environmental benefits, while avoiding unintended consequences for supply chains.

The intention of the industry leaders involved in developing this plan is that the strategies, outcomes and timeframes elaborated in this roadmap will define a nationally consistent approach on EPS packaging.

Background

The Australian Packaging Covenant Organisation (APCO) has led the development of this roadmap for industry's phase out of business-to-consumer (B2C) EPS packaging within the [ambitious timeframes](#) set through the [National Plastics Plan](#) and [Minister's Priority List](#). The process commenced with preliminary discussions with the Government and industry associations and an APCO industry webinar on EPS held on 8 June 2021.

The roadmap has been developed with input from the Australian Industry Group (Ai Group), Consumer Electronics Suppliers Association (CESA), Australian Information Industry Association (AIIA), Large Format Retailers Association (LFRA), National Retail Association (NRA), Expanded Polystyrene Australia (EPSA), Air-conditioning and Refrigeration Equipment Manufacturers Association of Australia, Chemistry Australia (CA) and Japan Refrigeration and Air Conditioning Industry Association (JRAIA). Input has also been provided by APCO Members and stakeholders.

The roadmap builds on previous industry initiatives to drive the reduction, reuse or recovery of EPS packaging. These include:

- Consultation and research undertaken by APCO's EPS Working Group in 2018, and their [summary report](#) on current issues and potential solutions.¹
- APCO's [Action Plan for Problematic and Unnecessary Single-use Plastics Packaging](#), which identified immediate actions to eliminate, reduce or redesign several categories of EPS packaging.²

Regulatory framework

The Australian Government Environment Minister's Priority List identifies the products and materials considered to be most in need of a product stewardship approach. The list includes reasons a product has been identified, recommended actions and timeframes for action. It is reviewed every 12 months and the Minister may edit the list to remove products, identify further actions, and add new products. This may include the Minister deciding to implement regulatory measures where adequate industry action has not been taken.

Publishing the Minister's Priority List provides certainty and transparency to the community and industry about what is being considered for regulation under the [Recycling and Waste Reduction Act 2020](#).

The Minister's Priority List for 2022-23 includes a number of problematic and unnecessary single-use plastic items. The recommended action for EPS is identified in the box below (Action 1).

The Australian Government has advised that it will periodically review industry progress in taking responsibility for the applicable packaging and container types, including phasing them out where required. It will then consider if any regulatory action (for example, a regulated ban, or a co-regulatory or mandatory product stewardship arrangement) is warranted or not. Before any regulation could come into effect it would first need to be considered through the [Australian Government's Regulatory Impact Analysis Framework](#).⁴

Some state and territory governments have also indicated an intention to regulate certain EPS packaging. The initial focus for most jurisdictions is on EPS food and beverage service packaging, although Western Australia has indicated an intention to ban some other EPS packaging as well.

Included in the priority list

Industry should agree nationally coordinated and harmonised plans to phase out the problematic and unnecessary single use plastics listed below. Industry should develop roadmaps that outline how the listed products will be phased out, including through staged timeframes for elimination, redesign, innovation and replacement with products that do not have known worse environmental outcomes.

- EPS loose packaging fill and moulded single-use EPS packaging for consumer products **by June 2022**.
- EPS consumer food beverage service containers **by December 2022**.³

Not included

The industry-led phase outs **do not apply to**:

- EPS used for business-to-business (B2B) packaging, such as fresh produce boxes, packaging for large pieces of business equipment and where a consumer product is installed by a professional installer and the packaging is retained by the business.
- Specialist packaging used in medical applications, for example, organ transport or pharmaceuticals.
- EPS used in building and construction.
- B2C packaging where there is a demonstrated and effective reuse model in operation, for example bulk cold home-delivered meal services.

Current Situation

EPS packaging flows

EPS material flows for 2019-20 are shown in Figure 1. It is estimated that around two-thirds of EPS materials were manufactured locally (primarily produce boxes), and the remainder imported as filled packaging, e.g. for appliances, electronics, lighting and furniture. The recycling rate is estimated to be 19% almost entirely from commercial and industrial (C&I) sources.

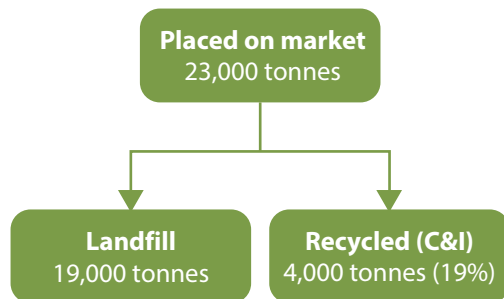


Figure 1 - EPS packaging material flows 2019-20⁵

Note: EPS packaging data is accurate for local manufacturing but difficult to capture for imported product. This leads to a relatively large accuracy data range (+/-20%).

Benefits of EPS packaging

EPS is lightweight, durable, thermally efficient, and versatile. Its benefits as a packaging material include:

- low density, therefore very light weight (95% air),
- ability to absorb high levels of energy when dropped or subjected to impact,
- low thermal conductivity, protecting contents against sudden temperature changes,
- chemically inert and therefore can be safely used for food packaging, and
- strength and durability, which are completely retained even on direct contact with water.⁶

EPS is used to protect packaged products during the distribution phase. It may be exposed to a range of seasonal climates and temperature extremes (from sub-zero up to 70°C inside shipping containers) as well as various storage conditions for lengthy periods (sometimes up to 12 months). As such, a high material performance demand is placed on EPS, including with regard to degradation, structural integrity and quality aspects for brand aesthetics.

Challenges of EPS packaging

EPS packaging presents a number of challenges that need to be addressed:

- **Environmental hazard:** EPS is one of the most common materials found in illegally dumped rubbish, presenting a significant environmental challenge as it is lightweight, highly visible and easily breaks down into small pieces.^{7,8}
- **Limited collection options:** EPS is not currently collected through kerbside recycling and, although there are a growing number of drop-off points and recycling processes (see section on [recycling](#)), the national network of drop-off points for EPS remains fragmented and not readily accessible to all consumers, and limited to specific types of moulded EPS.⁹
- **Landfill impact:** EPS takes up a disproportionately large space relative to its small weight in transport and landfill, which inhibits landfill compaction and generates extra expenses to local government and businesses that are not reflected in landfill disposal costs.¹⁰

The different types of EPS packaging and their impacts are summarised in Table 1.

Table 1: EPS packaging categories

Type of packaging	Common applications	Environmental issues	Priority for the roadmap
	EPS loose-fill packaging Packing peanuts generally used to protect products during transportation e.g. void fill or cushioning in e-commerce.	Not recyclable (too small). High environmental impact when littered.	High within scope of phase out.
	Consumer food and beverage packaging Single-use hot and cold cups, tubs, bowls, plates, trays and clamshells for food service. Trays to package fresh fruit or meat for retail sale.	Not recyclable through kerbside and no alternative collection system available. Lightweight material with extremely high litter propensity.	High within scope of phase out.
	Moulded consumer packaging Protective packaging for white/brown goods and electronics, e.g., computers, printers, TVs, fridges, air conditioners, ovens, fridges, toasters; as well as furniture and other homewares. Includes products requiring installation by specialists where the EPS is not retained by the specialist.	Not recyclable through kerbside. Limited availability of drop-off services to recycle. Low uptake of existing EPS collections by retailers. Lightweight and fragile material with high impact when littered.	High within scope of phase out.
	Produce boxes (B2B) Transporting fresh or frozen produce including fish, meat, fruit and vegetables.	Limited recycling services available.	Low out of scope of phase out but could be included in product stewardship initiatives.
	Specialist packaging (B2B) Medical applications e.g., organ transport or pharmaceuticals.	Limited recycling services available.	Low out of scope of phase out but could be included in product stewardship initiatives.

Technical and commercial challenges in implementing phase outs

Retailers and brand owners have provided feedback on some of the challenges that need to be considered in developing the roadmap.

Related standards

It is currently difficult to find a replacement for some applications that delivers the required level of functionality provided by EPS. Transport impacts must also be taken into consideration to ensure the quality and integrity of the product remains intact. The following related standards can be used to inform an approach to address consumer moulded EPS packaging that has no viable alternative at present (Category Group 3 within Table 2). For example:

- Alternatives for **transporting large, heavy (45-300kg), fragile and precision products** are particularly hard to find, as these materials are unable to provide sufficient protection and shock absorption when products reach a certain size:
 - Moulded pulp and cardboard cannot currently offer protection for repeated shocks, as they do not return to original state after absorbing shock.
 - Expanded polyethylene (EPE) and expanded polypropylene (EPP) are not acceptable as they are even more problematic to recycle than EPS due to a lack of collection and recycling services.

- Packaging for **electrical and electronic products** needs to meet technical standards and engineering tests, including drop tests. In some cases, EPS is the only material that meets the required standards such as:
 - Transport test requirements specified in Clause 21.2 and Annex GG of AS/NZS 60335.2.40, which is an industry quality test standard that requires appliances from factory to be delivered to end-users without quality issues, e.g., drop tests, vibration tests, rough handling tests etc.
 - International Safe Transit Association (ISTA) packaging test procedures, which are globally considered as best practice. Test Procedure 3B - Packaged Products for Less-Than-Truckload (LTL) Shipment, is highly applicable for large appliances. For drop tests, it sets appropriate drop heights per packaged product weights categories that are ≤18kg, ≤36kg, ≤45kg and ≤91kg.
 - Packaging performance test parameters found in ASTM International standards ASTM D4169, ASTM D880, and ASTM D6179.
 - Requirements for the safe packaging and transportation of refrigeration and air-conditioning equipment with pre-charged refrigerants.
- **Glass (e.g., TV sets and glass cooktops) and some furniture** need to be protected from scuffing, which can occur with cardboard packaging.

These related standards should be applied to guide an industry response to addressing the phase out, redesign or product stewardship approach of these formats. In some cases, these challenges can be addressed through changes in design, for example by strengthening the corners of corrugated boxes or improving palletisation. However, trials are often required to test the performance of alternative packaging systems in the supply chain.

When considering eliminating EPS, it is also important to consider the environmental performance of potential alternative materials. For example, consider whether there is an effective recovery pathway for the alternative materials.



Commercial challenges

There are also commercial challenges. They include:

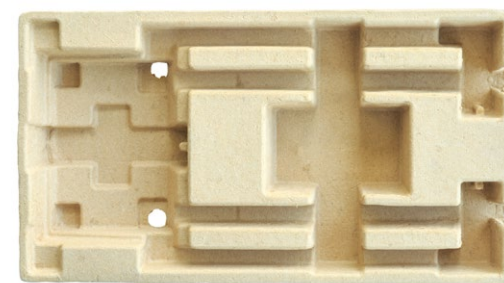
- **Cost:**
Cardboard generally costs more than EPS. If retooling is required, this can also be expensive. Some alternative packaging solutions can require larger cartons, which affects how many boxes will fit on a pallet or into a container and increases transport costs and greenhouse gas emissions.
- **Timing:**
Product lifecycles can take up to 3 years, so it is important to work with the supplier to work out a suitable time frame for phasing out the material.
- **Uncertain outcomes of trials:**
Risks related to trialling new packaging solutions require careful management and incremental progress, as well as consideration for the suppliers and people involved. Unsuccessful trials may cause resistance towards future efforts.
- **Technical and commercial viability:**
Other technical and commercial constraints may present barriers to the uptake of alternatives, for example the availability of sufficient quantities of packaging or the consistent availability of supply over the lifecycle of the product.

Existing environmental initiatives

Elimination

Businesses have been working to eliminate or reduce EPS in consumer products for a number of years, particularly for fresh produce, electrical and electronic products and appliances. Major supermarket chains have already replaced EPS packaging for fresh fruit and vegetables with returnable plastic crates.

Leading companies in the electrical and electronic product sectors have eliminated EPS or are in the process of doing so. Dell, for example, phased out EPS globally on all Dell-designed packaging over a 10-year period. The company recognised that customers did not want EPS, and despite it being a good cushioning material and inexpensive, began developing solutions to replace it with alternative materials including moulded fibre.



Other examples include:

- Officeworks has started to phase out EPS for own-brand furniture and shredders ([Box 1](#)).
- Beacon Lighting has replaced EPS with moulded pulp packaging ([Box 2](#)).
- Canon Australia is transitioning to moulded pulp packaging for all consumer inkjet print hardware ([Box 3](#)).
- HP is also transitioning to moulded pulp packaging for personal computers and printers ([Box 4](#)).

While barriers for some items currently exist, businesses are already investigating solutions, and technology is continuing to advance worldwide.

In Australia, applied innovative alternatives to EPS include Woolpack by [Planet Protector Packaging](#), Envirofill wheat starch loose fill packaging from [Pro-Pac Packaging](#), suspension packaging from [Sealed Air](#) and [Ranpak's](#) paper-based protective packaging.

Box 1: Officeworks phases out EPS in all own-brand products

Retailer Officeworks has eliminated EPS from its own-brand products.

The company eliminated polystyrene from all furniture products through improvements in design to 'right-size' packaging and replaced EPS with cardboard components where cushioning or filling was required.

Replacing EPS for technology products has been more complex. A successful partnership with a global brand has resulted in the elimination of EPS in Officeworks' private label shredders.

The new packaging required new tooling costs which initially were a barrier. Officeworks was able to negotiate cost sharing investment between the relevant factory and international customers who shared the same mould.

Packaging with EPS



Packaging without EPS



Box 2: Beacon Lighting elimination of EPS packaging¹¹

Beacon Lighting has successfully replaced EPS with a recyclable and rigid material which is both cost effective and environmentally beneficial.

Research into other forms of packaging material took place during 2019, with an emphasis on material that would be fully recyclable, proven as a solid and reliable material for commercial packaging use, and able to be custom manufactured to mould around Beacon Lighting's products.

Challenges

1. Initial high cost of start-up tooling in producing a packaging mould.
2. Limited manufacturers available to produce customised packaging moulds.

Solution

Beacon Lighting's suppliers engaged with packaging manufacturers that were able to accommodate the requirement for customised packaging moulds to suit the products.

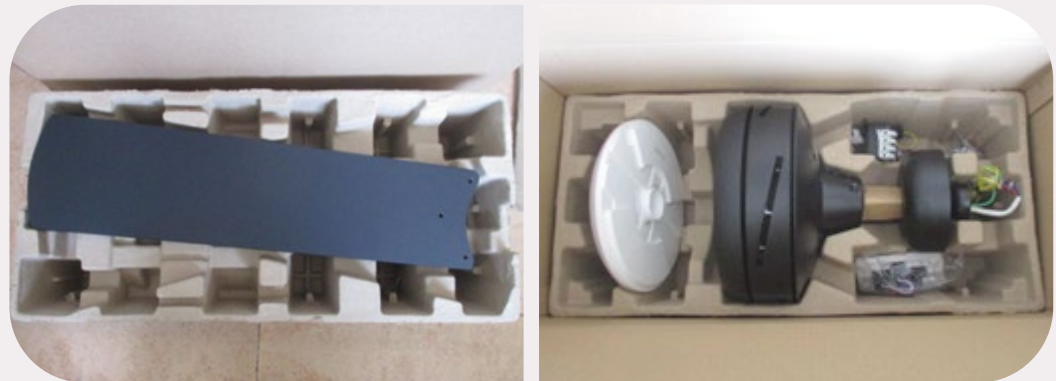
Results

Beacon Lighting's ability to work directly with suppliers, enabled them to source packaging manufacturers that could produce custom moulds for custom packaging, using moulded pulp material which is 100% recyclable and is cost-effective due to the volume produced.

Packaging with EPS



Packaging without EPS



Box 3: Canon phasing out EPS for print hardware packaging

All new Canon consumer inkjet print hardware products will feature moulded pulp packaging, replacing EPS packaging which has traditionally been used for these products.

Canon Australia currently has two models of consumer printer where polystyrene has been removed and replaced with moulded pulp (TS 3460 and a new model about to be launched).

The vast majority of current Canon consumer print hardware products packaging will transition to moulded pulp over the next 18-24 months.

Canon Australia is also working towards delivering on Australia's 2025 National Packaging Targets for 100% of Australia's packaging being reusable, recyclable or compostable by 2025 or earlier.

Box 4: HP packaging initiatives to reduce EPS packaging

In 2018, HP committed to reduce 75% of single-use plastic packaging by 2025. Through 2020, HP achieved a 19% decrease in single-use plastic packaging, reducing the average plastic used from 221 grams/unit in 2018 to 180 grams/unit.

Personal systems

HP has accelerated efforts to replace EPS in favour of fibre-based packaging cushions in personal systems. HP reports that, since 2018, over 30 million personal systems products have shipped using moulded fibre packaging, which in addition to typically containing 100% recycled content, has eliminated 3,930 tonnes of hard-to-recycle plastics.

Print

HP continues to make progress reducing plastic packaging in print products, which can be challenging given the sensitivity and weight of a printer. HP has optimised foam packaging and launched products in moulded fibre cushioning in several products. For example, reducing the cushion density in the HP LaserJet M227 multi-function printer has decreased plastic foam use by 15% and eliminated more than 26 tonnes of plastic annually. HP also launched the HP DeskJet 2700 in moulded fibre cushioning, which HP reports avoided 19 tonnes of plastic foam packaging in 2020. Finally, by redesigning the LaserJet M1005 MFP package, HP reduced plastic foam by 40% and eliminated over 95 tonnes of the material in 2019. More than 700,000 A3 toner supplies shipped in fibre-based packing in 2020, and HP has begun incorporating 80% recycled polyethylene in HP Instant Ink takeback pouches.

Reuse

While some EPS boxes are cleaned and reused in certain applications, this is often done informally and likely to be a very small percentage of the market.

The durability of EPS allows it to be continually reused, particularly in the transportation of fresh or frozen foods (see [Box 5](#)). However, issues arise with reuse transportation costs – despite being very lightweight, EPS has a considerable volume. Moreover, reuse is not practical for most take-away packaging or white goods/electronics packaging.

Box 5: Polyfoam Australia & Lite N Easy home delivery service

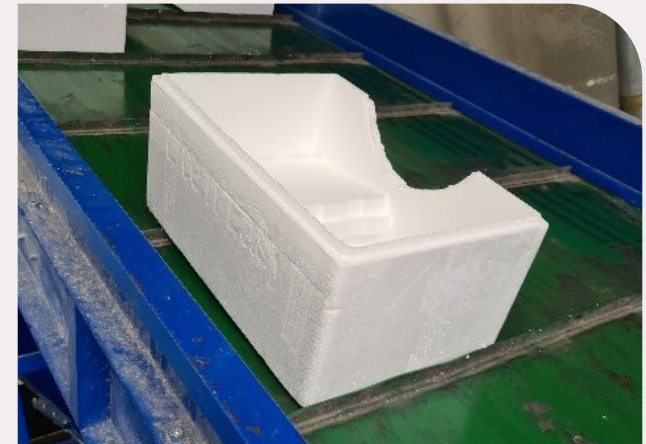
Lite N Easy provides delivery of fresh meals and produce directly to homes.

To keep the meals cold, Lite N Easy uses recyclable and reusable EPS boxes, made by Australian company Polyfoam.

Lite N Easy customers are provided with information about how to reuse their boxes – they leave them at their door prior to delivery and the old box is collected when the new one is dropped off.

The box is cleaned and reused between three and five times. Once it's reached the end of its life, it is returned to Polyfoam for recycling.

The result is another box which can be used, reused and recycled again or turned into EPS waffle pods used in construction.



Recycling

EPS is not collected for recycling at kerbside in Australia. This is not expected to change, because EPS is problematic in Material Recovery Facilities, where it can break into tiny pieces that contaminate other streams and cause litter issues.¹²

There are a small number of collectors and recyclers across Australia. Expanded Polystyrene Australia (EPSA) has published [Guidelines and Requirements](#) for EPSA members participating in its EPS Foam Recycling Drop-Off Scheme.

The Guidelines and Requirements specify what can and cannot be accepted for recycling, in order to encourage collection of a clean stream of EPS, and thereby increase the value of the recyclate.¹³ EPSA members have also established a network of collection points for recycling (see Figure 2 and [Box 6](#)).

Some councils provide a drop-off facility for EPS for householders, including some Community Recycling Centres (CRCs) in NSW.

Some EPS manufacturers and companies also provide **drop-off facilities** for the collection of bulk quantities of waste EPS for recycling. Additionally, there are various commercial collection services provided by companies such as **Ecycle solutions** ([Box 7](#)), **Cleanaway**, **SUEZ**, **IS Recycling** and **Foam Muncher** ([Box 8](#)).

Retailers and warehouses separate their EPS into bags or cages for collection by a commercial business or for reverse logistics after product deliveries. Compactors or extruders can also be rented to assist with collection volumes and capacity. Some retailers have implemented delivery, unpacking and packaging takeback programs, which are enabling the aggregation of B2C EPS for recycling.

End markets for collected EPS include:

- densification, compaction and export (e.g., to China, Korea, Turkey) for use as a virgin raw material substitute in extruded general-purpose polystyrene (GPSS) product lines, such as picture frames, CD/DVD cases and fashion hangers.
- use in local manufacturing blocks, sheet, surfboard blanks and other products by [Polystyrene Solutions](#). Polystyrene Solutions' recycling process uses steam to manufacture products which can contain up to 70% recycled EPS packaging. These products include made-to-order products for the construction, marine and film industries.

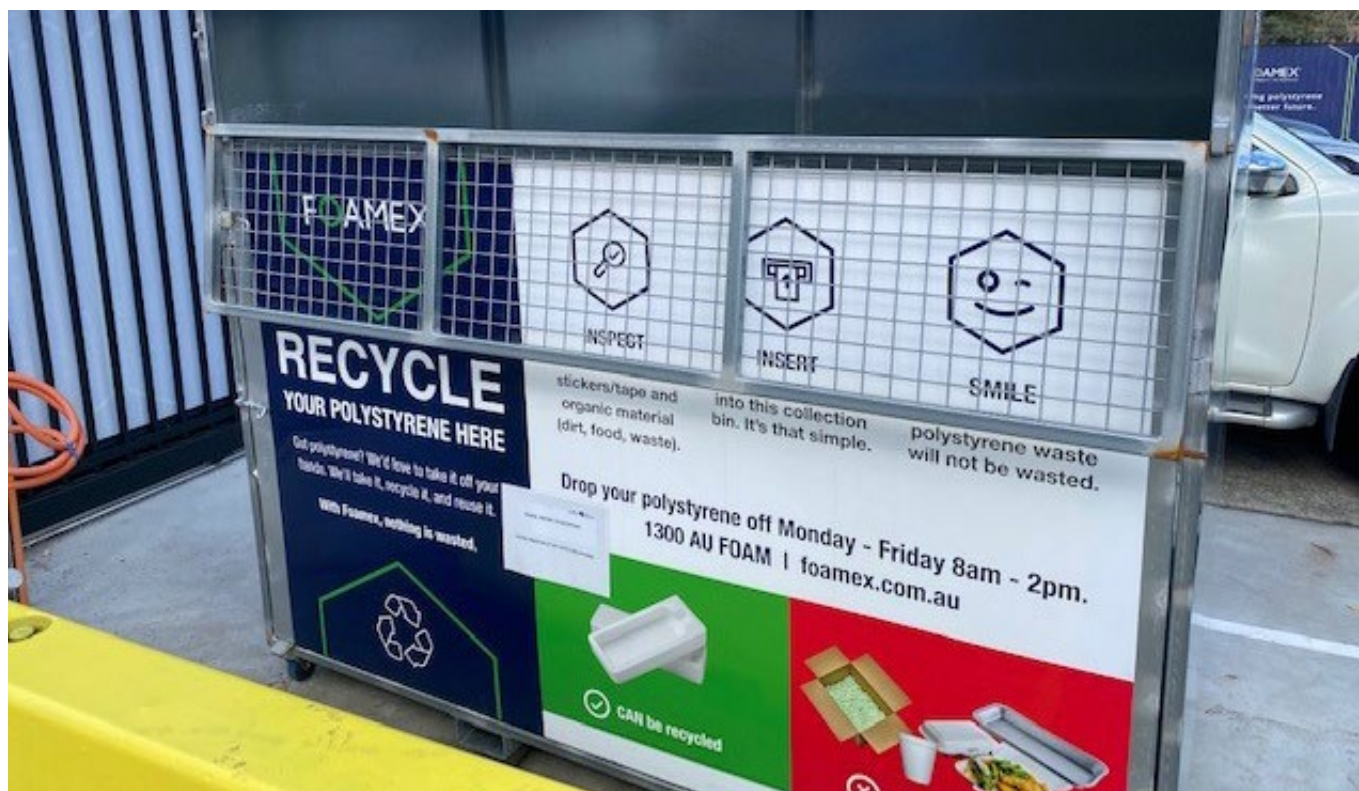


Figure 2 - A Foamex recycling bin for the drop-off of EPS material

Box 6: Expanded Polystyrene Australia program and Pod Slab Sales¹⁴

The EPSA Packaging Group has established a National Collection Network to drive the collection and recycling of EPS material. Collection Centres are now located in most major capital cities across Australia, including at participating electrical retail outlets and local council waste transfer stations. These sites readily accept all types of EPS material from both packaging and construction applications for recycling.

The National Collection Network has been funded through a voluntary Waste Minimisation Levy Program supported by EPSA Packaging members. These funds have enabled equipment to be purchased for EPS recycling and supported the operation of the EPS Collection Centres to provide environmentally responsible outlets for all end users to have their waste EPS produce boxes recycled.

The EPSA website includes a [map](#) of available drop-off points.

Pod Slab Sales is among a number of key businesses that are leading the way in recovery and recycling of EPS, creating a closed loop system which collects and recycles moulded EPS packaging into environmentally efficient building materials.

Pod Slab Sales picks up EPS from National Collection Network sites and turns it into new, sustainably produced EPS products, including waffle pods used for construction.

Additionally, all off-cuts from waffle pods are also recycled.



Box 7: Ecycle Solutions

[Ecycle Solutions](#), a part of the QLS Group, is an approved Co-Regulatory Arrangement under the National Television and Computer Recycling Scheme (NTCRS).

As a leading warehousing, logistics and distribution company, the QLS Group saw the need to provide businesses around Australia with accessible, affordable and environmentally sustainable recycling options.

With over 100 trucks delivering products across Australia every day, it made sense to offer their partners an easy, low-cost waste collection solution for both electrical and electronic waste (e-waste) and EPS packaging.

Customers are provided with 2 cubic metre bulker bags and special EPS collection frames. Once filled, Ecycle Solutions collect the EPS and return it to their national network of recycling plants for processing. This process costs partners 70% less for EPS disposal than sending to landfill.

Specialised hot compact technology dramatically compacts EPS. Once compacted, the EPS material is exported to processing plants around the world to be repurposed into new products including picture frames, skirting boards, outdoor furniture and decking.



Box 8: Foam Muncher: Mobile EPS processing service

WastePro, founders of the [Foam Muncher](#) business, received a small NSW EPA Circulate Grant in 2019 to increase recycling of EPS in Sydney.

In December 2021, Foam Muncher completed its first mobile EPS recycling truck, capable of processing over 40 cubic metres of EPS per hour, achieving a capacity of 2-3 tonne per day, or nearly 1,000 tonnes annually.

As a semi-trailer load of loose EPS only weighs 200kg, carrying EPS is a major impediment to efficient recycling. Processing EPS on the run, eliminates the need to carry the material in its loose form and enables Foam Muncher to be cost-efficient while providing a service over wider areas.

Foam Muncher is now able to offer councils the opportunity to provide EPS drop-off services to the public, where it was previously not possible due to equipment complexities. Foam Muncher reports that in one LGA in Sydney with a population of 150,000, 1,750 cubic metres are collected and recycled on average per year.

WastePro were also the first Australian company to receive a waste export licence for the export of densified EPS, and is working with local manufacturers to develop local markets for recycled EPS.



The Roadmap

Strategies for implementing the phase out of EPS

In 2021, an industry roundtable reviewed existing packaging formats for EPS phase outs and the potential strategies to achieve them. These discussions ([Appendix 2](#)) informed the roadmap. The review identified five categories of EPS packaging that require different approaches (Table 2 Phasing out EPS is a significant priority for industry. Through the roadmap, industry has committed to the following approach:

Table 2: EPS categories for action

Category	Criteria for inclusion	Examples	What should businesses do	Outcomes
Group 1 Consumer EPS packaging for immediate phase out	- Alternatives available. - Short product lifecycle.	- Food service packaging, retail fresh produce trays. - Loose fill packaging.	Review packaging and develop an action plan to phase out, eliminate or replace with a reusable or recyclable alternative.	- Action plans developed by March 2023. - Eliminate loose fill by July 2022. - Eliminate moulded by July 2022. - Eliminate food service packaging by December 2022.
Group 2 Consumer moulded EPS packaging for medium term phase out	- Products with longer product cycles beyond 2022, where EPS packaging has already been designed and manufactured and therefore could not be phased out by July 2022 without additional cost and waste. OR - Alternatives require work to develop and test e.g., due to complexity of products.	- Moulded packaging for small to medium sized electrical and electronic products, such as lighting, furniture, range hoods. - Pre-packed ready noodles.	Review packaging and develop an action plan to phase out EPS based on product cycles – eliminate or replace with a reusable or recyclable alternative.	- Action plans developed by March 2023. - Pathway established by March 2023 to deliver progressive reductions, at point of sale, of: 80% by July 2023. 90% by July 2024. 100% by July 2025.

Table 2: EPS categories for action (CONTINUED)

Category	Criteria for inclusion	Examples	What should businesses do	Outcomes
Group 3 Consumer moulded EPS packaging that has no viable alternative at present	- Large and heavy products 45kg and over where it can be demonstrated there is no currently viable alternative. - Precision and fragile products, which may be less than 45kg, with rigorous test standards for packaging where it can be demonstrated that there is no viable alternative. - Products that would otherwise be in Group 2 but where there is a temporary barrier to phase out such as a longer product lifecycle extending past July 2025.	- Large TVs. - BBQs, large and fragile furniture. - Large white goods. - Air conditioners and heat pumps. - Other precision equipment.	Review packaging and develop an action plan – undertake further research and development (R&D) to develop alternatives and participate in creating a robust product stewardship program.	- Action plans developed by March 2023. - Product stewardship program options developed with proposed governance, funding mechanism and measurable targets by December 2023. Clear objectives and targets to be agreed by industry and the Federal Government. - Considerations will include free-rider protections, accessibility of collection options for consumers, and the roles of suppliers, retailers, consumers and recyclers. - A robust product stewardship program that is easily accessible to consumers to help them recycle EPS in place by July 2025.
Group 4 Consumer EPS packaging suitable for reuse*	- Closed loop delivery system (ability for back loading). - No direct food contact.	Bulk cold home-delivered meal services.	Develop an action plan for reuse – consider feasibility for convenience, consumer acceptance, costs and environmental impact compared to single-use.	- Action plans developed by March 2023. - Businesses either have a reuse system in place or phase out by December 2022.
Group 5 Business-to-business EPS packaging (out of scope for the National Plastics Plan and the Minister's Priority List)	Primarily used for B2B packaging.	- Boxes for fresh produce – meat, fish, fruit, vegetables. - Distribution packaging for business equipment.	Join the industry product stewardship scheme for recycling.	Product stewardship scheme in place with B2B businesses.

* See definition of reusable packaging in Appendix 1.

Action Plan

This roadmap focuses on four strategies:

- **Strategy 1** - Support the food services sector to eliminate EPS in food service packaging by December 2022 and other sectors to eliminate moulded and loose-fill EPS packaging by July 2022.
- **Strategy 2** - Businesses to develop Action Plans by March 2023 to phase out EPS packaging for small to medium sized electrical, electronics and homewares products at the earliest practicable time, where this is not achieved by July 2022. Pathway established by March 2023 to deliver progressive reductions of 80% by July 2023, 90% by July 2024, and 100% by July 2025.

- **Strategy 3** - Design a product stewardship program with ambitious recycling targets for recycling rates and consumer access by December 2023 to collect and recycle necessary EPS packaging
- **Strategy 4** - Develop a self-reporting measurement and monitoring program to track progress towards the objectives of the EPS Roadmap. APCO will work with government to ensure a reliable and transparent data methodology which may include the implementation of independent audit protocols to manage progress against the planned activities.

APCO and industry commit to the following actions listed in Table 3:

Table 3: Strategies and actions, responsibilities and timeframes

Strategy and action	Lead agency	Partners	Timeline
1. Support the food services sector to eliminate EPS in food service packaging by December 2022 and other sectors to eliminate moulded and loose-fill EPS packaging by July 2022.			
Agree on a targeted engagement program for the food services sector and other sectors.	APCO	AFGC, Ai Group, NRA	July 2023
Run knowledge sharing sessions to provide practical information on alternative products and materials and case studies.	APCO	AFGC, Ai Group, NRA Packaging suppliers	Completed
Promote existing resources through industry association networks e.g., Action Plan for Problematic and Unnecessary Single-Use Plastic Packaging , Considerations for Compostable Packaging and Food Services Packaging Sustainability Guidelines .	APCO	AFGC, Ai Group, NRA, CESA, AIIA, AREMA	Completed

Table 3: Strategies and actions, responsibilities and timeframes

Strategy and action	Lead agency	Partners	Timeline
2. Businesses to develop action plans by March 2023 to phase out EPS packaging for small to medium sized electrical, electronics, furniture and homewares products at the earliest practicable time, where this is not achieved by July 2022.			
Develop and implement a template and guidance (including guidance in relation to timeframes for eliminating EPS from specific products) for businesses' action plans and a process for aggregation and reporting. Alternatives that are equally problematic, such as EPE and EPP, are not acceptable and should also be avoided in favour of recyclable materials.	APCO	AFGC, Ai Group, NRA, AIIA, AREMA	November 2022
Undertake a targeted engagement program for industry association members including online suppliers, to raise awareness of the requirement to phase out B2C EPS and to submit and develop action plans (APCO Members and non-Members).	CESA, Ai Group LFRA	APCO	March 2023
Run knowledge sharing sessions to provide practical information on alternative products and materials and case studies.	APCO	CESA, Ai Group, LFRA	Completed
Businesses to develop action plans to phase out EPS packaging for their electrical, electronics, furniture and homewares products and submit to APCO for review and compilation. The action plans will identify products for which more time will be needed to phase out EPS beyond July 2022 and the timeframes applicable to those products. For completeness, it is anticipated that the action plans will be submitted along with information on in-scope products for which EPS has already been phased out (see also Strategy 4, below).	APCO	CESA, Ai Group, LFRA, AIIA, AREMA	March 2023
APCO to review the action plans submitted by industry, and evaluate the degree to which the plans will enable industry to deliver on the phase out of B2C EPS as elaborated in this roadmap. APCO will then provide an aggregated planning document to the Australian Government, along with its evaluation of progress and recommendations for any further action.	APCO	CESA, Ai Group, LFRA, AIIA, AREMA	April 2023
Review of the Minister's Priority List in relation to EPS phase outs, informed by APCO's review and evaluation of industry action plans and progress as outlined above.	Australian Government	APCO	April – June 2023
Publish information on action plans on APCO and the Department of Environment Water and Environment (DAWE) websites.	APCO	DAWE	February 2023

Table 3: Strategies and actions, responsibilities and timeframes (CONTINUED)

Strategy and action	Lead agency	Partners	Timeline
3. Develop a product stewardship program by December 2025 to collect and recycle necessary EPS packaging.			
Establish an EPS Working Group to plan and oversee the development of options for a product stewardship scheme that will deliver clear objectives and targets.	Facilitated by APCO in collaboration with Government and Industry	EPSA, CESA, Ai Group, LFRA, CA, AIIA, AREMA Collectors and recyclers Federal, State and Local Government	Completed
Define the opportunity for a product stewardship scheme for EPS through data collection, stakeholder mapping and business modeling. Obtain appropriate commitment from Industry and Government to support a stewardship scheme for EPS.	Facilitated by APCO in collaboration with Government and Industry	As above	December 2023
Upon agreement and definition of an appropriate model, defined and agreed by key stakeholders, progress towards implementation of a scheme by 2025.	Facilitated by APCO in collaboration with Government and Industry	As above	December 2025
Include the EPS supply chain in Operation Cleansweep .	Chemistry Australia		June 2023

Table 3: Strategies and actions, responsibilities and timeframes (CONTINUED)

Strategy and action	Lead agency	Partners	Timeline
4. Develop a self-reporting measurement and monitoring program to track progress towards the objectives of the EPS roadmap.			
Agree on an approach to measuring and reporting on the success of the EPS phase out.	APCO	Industry associations, Federal Government	December 2022
Collect more detailed annual data on total consumption and recycling of EPS including the applications addressed in this roadmap.	APCO		Annual
Collect data from industry (in alignment with existing reporting arrangements and/or the action plans referred to under Strategy 3 above, where possible) on use of EPS packaging, whether action is being taken to phase it out in in-scope applications or it has already been eliminated.	APCO		Annual from 2023

Conclusion

This roadmap has been developed by industry and in consultation with the Commonwealth and state and territory governments. It provides a nationally agreed pathway to deliver on the phase out of B2C EPS called for in the National Plastics Plan.

Implementation of the roadmap will be led by APCO and its Members in partnership with the industry associations mentioned in the roadmap, with ongoing engagement with governments.

Please contact APCO at apco@apco.org.au with any questions about the roadmap.

Appendix 1: Glossary

Business-to-business (B2B) packaging

Packaging used for the containment, protection, or handling of product where the end-customer, prior to the packaging reaching end-of-life, is a business or institution. Typically includes the secondary and tertiary packaging that is used to move products between businesses prior to sale to end-consumers but can also include primary packaging if the business is the end-user. Same meaning as 'Commercial packaging'. Also see 'Packaging' and 'Business-to-consumer (B2C) packaging'.

Business-to-consumer (B2C) packaging

Packaging used for the containment, protection, marketing, or handling of product where the end-customer, prior to the packaging reaching end-of-life, is a consumer (i.e., a person). Includes the primary packaging that is sold to end-consumer, and possibly some secondary packaging, but excludes any B2B packaging that is part of the packaging system. Same meaning as 'Consumer packaging'. Also see 'Packaging' and 'Business-to-business (B2B) packaging'.

Commercial & industrial (C&I)

Solid inert waste generated from trade, commercial and industrial activities including the government sector. It includes waste from offices, manufacturing, factories, schools, universities, state and government operations and small to medium enterprises e.g., food waste.

EPE

Expanded polyethylene

EPP

Expanded polypropylene

EPS

Expanded polystyrene

Foam packaging

Foam plastic packaging is in a lightweight cellular form resulting from introduction of gas bubbles during manufacture. Foam packaging is typically used to reduce shock and vibration or abrasion. The most common example used in packaging is expanded polystyrene (EPS).

Reusable packaging¹⁵

Packaging which has been designed to accomplish or proves its ability to accomplish a minimum number of trips or rotations (1,2) in a system for reuse (3).

Supporting notes:

1. A trip is defined as transfer of packaging, from filling/loading to emptying/unloading. A rotation is defined as a cycle undergone by reusable packaging from filling/loading to filling/loading (ISO 18603).
2. The minimum number of trips or rotations refers to the fact that the 'system for reuse' in place should be proven to work in practice, i.e. that a significant share of the package is actually reused (measured e.g. by an average reuse rate or an average number of use-cycles per package).
3. A system for reuse is defined as established arrangements (organisational, technical or financial) which ensure the possibility of reuse, in closed-loop, open-loop or in a hybrid system (ISO 18603).

Recyclable packaging¹⁶

A packaging (1) or packaging component (2,3) is recyclable if its successful post-consumer (4) collection, sorting, and recycling is proven to work in practice and at scale.

Also see the related 'Compostable packaging' and 'Reusable packaging' definitions.

Supporting notes:

1. A package can be considered recyclable if its main packaging components, are recyclable according to the above definition, and if the remaining minor components are compatible with the recycling process and do not hinder the recyclability of the main components. The PREP design tool provides information on recyclability of packaging through kerbside collection services.
2. A packaging component is a part of packaging that can be separated by hand or by using simple physical means (ISO 18601), e.g. a cap, a lid and (non in-mould) labels.
3. A packaging component can only be considered recyclable if that entire component, excluding minor incidental constituents (5), is recyclable according to the definition above. If just one material of a multi-material component is recyclable, one can only claim recyclability of that material, not of the component as a whole (in line with ISO 14021).
4. ISO 14021 defines post-consumer material as material generated by households or by commercial, industrial and institutional facilities in their role as end users of the product which can no longer be used for its intended purpose. This includes returns of material from the distribution chain. It excludes pre-consumer material (e.g. production scrap).

ISO 18601:2013: A packaging constituent is a part from which packaging or its components are made and which cannot be separated by hand or by using simple physical means (e.g. a layer of a multi-layered pack or an in-mould label).

Appendix 2: Outcomes of EPS packaging review

This table summarises feedback from industry associations and companies obtained from the APCO EPS Working Groups run through 2019-21.

Note: The use of the term 'non-recyclable' in this table draws on the definition of 'recyclable packaging' in the glossary in Appendix 1: "A packaging (1) or packaging component (2,3) is recyclable if its successful post-consumer (4) collection, sorting, and recycling is proven to work in practice and at scale." While it recognised that EPS is can be effectively recycled once it has been collected, the absence of a national collection network for B2C EPS at scale means that it cannot be defined as recyclable in Australia under current conditions. For B2C moulded EPS, it is recognised that there are some existing collection services and product stewardship schemes in place, but that these need to be expanded for the material to be considered fully recyclable at a national scale.

Table 4: Summary of feedback from industry associations and companies

Type of product	Description	Market applications	Within scope of roadmap?	The problem	Are there alternatives available?	Level of difficulty to phase out	Existing initiatives to build on	Potential approach	Who needs to be involved	Timeline required by National Plastics Plan
 Loose fill consumer EPS packaging	Loose pieces of foam packaging, e.g., peanut shaped	Void fill and product protection for online retail sales	Yes	Litter, non-recyclable	Yes: e.g., polyethylene 'pillows'; in-house cardboard shredder; certified compostable loose-fill	Low	-	Immediate phase out. Redesign packaging to reduce air space and replace EPS with alternative material.	Brands, on-line retailers	July 2022
		Retail sale of bulk loose fill packaging	Yes	As above	As above	Low	-	Immediate phase out. Sell alternative products.	Retailers	July 2022
		Void fill and product protection for B2B transport	No	Litter, non-recyclable	-	Low	-	Consider alternatives	Retailers	July 2022

Table 4: Summary of feedback from industry associations and companies (CONTINUED)

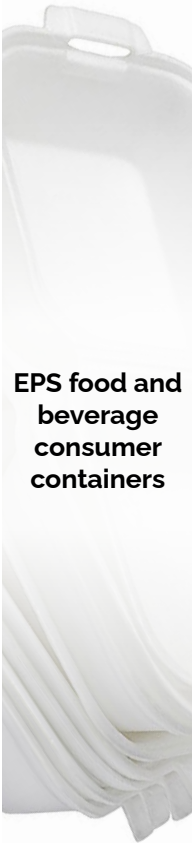
Type of product	Description	Market applications	Within scope of roadmap?	The problem	Are there alternatives available?	Level of difficulty to phase out	Existing initiatives to build on	Potential approach	Who needs to be involved	Timeline required by National Plastics Plan
 EPS food and beverage consumer containers	Hot and cold beverage cups	Containers for takeaway beverage service – cafes, quick service restaurants, events, catering etc.	Yes	Litter, non-recyclable	Yes: e.g., reusable cups, recyclable or certified compostable paper cups	Low	-	Immediate phase out. Encourage reuse and offer alternative single-use cups.	Packaging suppliers, food service businesses	December 2022
	Bowls and plates	Containers for takeaway food service (soups, noodles etc.).	Yes	Litter, non-recyclable	Yes: e.g., reusable containers; polypropylene and polymer coated paperboard containers	Low	-	Immediate phase out. Encourage reuse and offer alternative containers.	As above	December 2022
	Clamshells and other containers	Containers for takeaway beverage service - hot (e.g., burgers, fish & chips) or cold (e.g., ice cream)	Yes	Litter, non-recyclable	Yes: e.g., reusable containers; polymer coated paperboard containers	Low	-	Immediate phase out. Encourage reuse and offer alternative containers.	As above	December 2022
	Retail trays	Cushioning and display of fresh fruit, vegetables	Yes	Non-recyclable	Yes: e.g., recycled PET; PP; moulded pulp	Low	Companies already phasing out	Immediate phase out. Eliminate unnecessary packaging and replace with alternatives.	Retailers, produce suppliers	December 2022

Table 4: Summary of feedback from industry associations and companies (CONTINUED)

Type of product	Description	Market applications	Within scope of roadmap?	The problem	Are there alternatives available?	Level of difficulty to phase out	Existing initiatives to build on	Potential approach	Who needs to be involved	Timeline required by National Plastics Plan
EPS pre-packaged food packaging	Tubs or pots	Noodles	Yes	Non-recyclable	Yes: ECO Cup, PP	Medium	-	Develop action plan and timeline for phase out.	Brands	December 2022
 Moulded consumer EPS packaging	Moulded shapes	Protection of large appliances e.g., fridges, televisions, ovens etc	Yes	Limited collection options	Yes, for some applications e.g., corrugated cradles and inserts. Difficult to meet drop test standards for sensitive products.	High	Some brands and retailers offer take-back with product delivery	Establish product stewardship scheme fit for purpose only where no alternative product is currently available.	Brands	July 2022
		Protection of small appliances e.g., kettles, microwaves, hairdryers etc.	Yes	Limited collection options	Yes: e.g., moulded pulp; corrugated cradles and inserts; PE pillows.	Medium	-	Investigate alternative materials/suppliers. Develop action plan and timeline for phase out.	Brands	July 2022
		Protection of large electronics e.g., computers, printers, multi-function devices, shredders	Yes	Limited collection options	No: R&D underway but no short to medium term solution available.	Medium	Some brands and retailers offer take-back with product delivery. There are some existing drop-off network (limited availability)	Develop action plan and timeline for phase out where feasible. Establish product stewardship program to collect and recycle at end-of-life.	Brands	July 2022

Table 4: Summary of feedback from industry associations and companies (CONTINUED)

Type of product	Description	Market applications	Within scope of roadmap?	The problem	Are there alternatives available?	Level of difficulty to phase out	Existing initiatives to build on	Potential approach	Who needs to be involved	Timeline required by National Plastics Plan
 Moulded consumer EPS packaging	Moulded shapes	Protection of small electronics e.g., laptops, shredders, toner cartridges etc.	Yes	Limited collection options	Yes, for some applications e.g., corrugated cradles and inserts. Difficult to meet drop test standards for some sensitive products.	Medium	Existing drop-off network (limited availability)	Develop action plan and timeline for phase out where feasible. Establish product stewardship program to collect and recycle at end-of-life.	Brands	July 2022
		Protection of other electrical, e.g., lamps	Yes	Limited collection options	As above	Medium	Existing drop-off network (limited availability)	As above	Brands	July 2022
		Protection of Furniture	Yes	Limited collection options	Yes: moulded pulp; corrugated cradles and inserts; PE foam wrap. May be limited applicability for some fragile items e.g. large glass panels	Medium	As above	Develop action plan and timeline for phase out where feasible. Establish product stewardship program to collect and recycle at end-of-life.	Brands, retailers	July 2022
	Boxes	Containment and insulation for home delivery of bulk pre-prepared meals	Yes	Limited collection options	Yes: reusable packaging systems; wool packaging.	Medium	Some companies offer return system	Develop action plan and timeline to introduce a reuse system or phase out by 2025.	Brands	July 2022

Table 4: Summary of feedback from industry associations and companies (CONTINUED)

Type of product	Description	Market applications	Within scope of roadmap?	The problem	Are there alternatives available?	Level of difficulty to phase out	Existing initiatives to build on	Potential approach	Who needs to be involved	Timeline required by National Plastics Plan
Moulded consumer EPS packaging	Boxes	Cold chain home delivery of fresh produce e.g., fish, cheese etc.	Yes	Limited collection options	Yes: reusable packaging systems; wool packaging	Medium	Some companies offer return system	Develop action plan and timeline to introduce a reuse system or phase out by 2025.	Brands, retailers	July 2022
 Moulded B2B EPS packaging	Boxes	Cold chain packaging for fresh fruit, vegetables, meat and fish	No	Incomplete coverage of product stewardship schemes	-	Medium	Existing recycling services (fragmented)	Consider reusable alternatives. Support product stewardship program for EPS.	Brands, retailers	NA
	Specialist insulated packaging	Cold chain transport of pharmaceutical products, human organs etc.	No	Incomplete coverage of product stewardship schemes	-	High	As above – pre consumer only	As above	Brands, medical facilities	NA
Other (i.e. non-EPS) expanded plastic foams	Loose fill and moulded packaging	Various applications	No	Non-recyclable	Same alternatives as EPS	Low	-	Not an acceptable alternative to EPS due to non-recyclability.	Brands, medical facilities	NA

References

1. Australian Packaging Covenant Organisation, 2019. Expanded polystyrene Working Group 2018. Available at [https://documents.packagingcovenant.org.au/public-documents/Expanded%20Polystyrene%20\(EPS\)%202018%20Working%20Group%20Key%20Findings](https://documents.packagingcovenant.org.au/public-documents/Expanded%20Polystyrene%20(EPS)%202018%20Working%20Group%20Key%20Findings).
2. Australian Packaging Covenant Organisation, 2020a. Action Plan for Problematic and Unnecessary Single-Use Packaging. Available at: <https://documents.packagingcovenant.org.au/public-documents/Action%20Plan%20for%20Problematic%20and%20Unnecessary%20Single-Use%20Plastic%20Packaging>
3. Australian Government, 2021a. Ministers Priority List 2022-23. Available at: <https://www.dcceew.gov.au/environment/protection/waste/product-stewardship/ministers-priority-list/2022-23#problematic-and-unnecessary-single-use-plastics>
4. Australian Government, 2021b. National Plastics Plan – Pathway to more sustainable use of expanded polystyrene (EPS). Available at: <https://www.environment.gov.au/system/files/resources/ed5572d9-f763-4f80-a920-59606bf225af/files/eps-factsheet.pdf>
5. Based on: Australian Packaging Covenant Organisation, 2020b. Australian Packaging Consumption and Recycling Data 2018-19. Available at: <https://documents.packagingcovenant.org.au/public-documents/Australian%20Packaging%20Consumption%20And%20Recycling%20Data%202018-19>
6. Expanded Polystyrene Australia, 2018. EPS in Packaging. Available at: <http://epsa.org.au/about-eps/eps-in-packaging/>
7. Clean Up Australia, 2019. The 2019 Rubbish Report – National. Available at: https://irp-cdn.multiscreensite.com/ed061800/files/uploaded/NATIONAL_Rubbish%20Report_2019.pdf
8. Yarra Riverkeeper Association, 2020. Polystyrene Pollution in the Yarra River: Sources and Solutions. Available at: <http://yarrariver.org.au/wp-content/uploads/2020/08/42-Polystyrene-Pollution-in-the-Yarra-River-single-lowres.pdf>
9. Expanded Polystyrene Australia, 2020. EPS recyclers. Available at: <http://epsa.org.au/where-can-i-recycle-eps/>
10. One Planet Consulting, 2017. Preliminary regulatory impact statement for recycling scheme for expanded polystyrene in the ACT. Report to AC T Government. Available at: https://www.helenmillicer.com/wp-content/uploads/2018/12/2017-18_EPS_PublicReport_OnePlanetConsulting.pdf
11. Beacon Lighting, 2021. Case study: elimination of polystyrene from product packaging, 30 March. Available at https://www.beaconlighting.com.au/media/wysiwyg/Case_Study_-_Elimination_of_Polystyrene_Packaging.pdf
12. Planet Ark, 2018. Recycling Near You. Polystyrene: Drop off facilities for polystyrene. Available at: <https://recyclingnearyou.com.au/polystyrene>
13. Expanded Polystyrene Australia, 2021a. EPS Foam Recycling Drop-Off Scheme: Guidelines and Requirements. Available at: <http://epsa.org.au/wp-content/uploads/2014/01/EPSA-recycling-guidelines-and-requirements.pdf>
14. Expanded Polystyrene Australia, 2021b. EPSA Organisation. Available at: <http://epsa.org.au/about-us/epsa-organisation/>
15. Ellen Macarthur Foundation, 2020. New Plastics Economy Global Commitment. Available at: https://www.newplasticseconomy.org/assets/doc/Global-Commitment_Definitions_2020-1.pdf
16. Ellen Macarthur Foundation, 2020.