

3.03 Diverting Polystyrene from landfill

Funded through the Metropolitan Local Government Waste and
Resource Recovery Fund

Final report

City of Monash

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The Metropolitan Local Government Waste and Resource Recovery Fund

The Metropolitan Local Government Waste and Resource Recovery Fund (Metro Fund) is a Victorian Government initiative aimed at assisting councils in metropolitan Melbourne implement best practice waste collection and management systems in line with the *2009 Metropolitan Waste and Resource Recovery Strategic Plan* (Strategic Plan).

The Metro Fund is administered by the Metropolitan Waste and Resource Recovery Group. For more information please visit www.mwrrg.vic.gov.au.

1 Executive summary

The Diverting Polystyrene from landfill project aim was to purchase an EPS extrusion machine to recycle EPS on site, reducing litter and transport costs and to increase the capacity of the Monash Transfer station to receive and divert EPS from landfill, reducing landfill airspace. The project objectives were to improve collections and source separation of EPS onsite and secure an end market for briquettes; increased community awareness of the EPS recycling facility at the Transfer station; increase resource recovery by 50% of baseline volume; reduction in transport costs by 50% and reduction of waste to landfill by 900m³ over 6 months.

The Transfer station had participated in a trial EPS recycling project, whereby EPS was stored uncompacted in cages and transported to a recycler. At the conclusion of the trial, the service became a cost to Council for transporting EPS. Having established the Transfer station as a drop off point and a receiving a regular input of EPS, Council wanted to continue to provide this service. Research was conducted into the different types of EPS recycling units in use at NSW Councils to determine the type of unit fit for Monash. Site selection for the unit commenced including installation of 3 phase power and a suitable undercover area for the unit and storing EPS.

The project achieved a reduction of transport costs by 100%, a net increase in customer numbers by 75%, improvements to the collection and source separation of EPS onsite, a secured end market for briquettes, increase of resource recovery of EPS by 33% and reduction of waste to landfill by 306m³ over 6 months.

It is recommended that EPS extrusion machines are considered part of a resource recovery strategy for Melbourne metropolitan Transfer stations to provide an EPS recycling service for residents and industry, and to build the local end market for recycled EPS briquette.

2 Project details

EPS (PS6) is a common packaging item, identified by small white beads that comprise the foam, frequently used in packaging large consumer goods and industrial packing. The use of this material is not in decline, and the community has an expectation that alternative recycling solutions are available for packaging items that cannot be recycled in the kerbside collection. Monash Council was part of the Sustainability Victoria (SV) and MWRRG funded Local Government Polystyrene Resource Recovery Project (2012). The project was promoted in a limited capacity to residents, but not neighbouring residents or industry. At the conclusion of the project, Council continued to accept polystyrene for recycling, resulting in transport costs (of EPS to the recycler) absorbed by Council. Council wanted to continue to provide an EPS recycling service but with greater capacity, efficiency and less transport costs. Customers had been educated at the window on what type of EPS was accepted and contamination was relatively low. The Transfer station was storing and transporting expanded polystyrene in four 17m³ cages, and was therefore limited in the amount of polystyrene it could accept. This project was designed to enable EPS recycling on site to increase the capacity of the Transfer station to receive and process EPS and to secure an end market for the briquettes that would reduce transport costs.

The NSW EPA had funded EPS recycling projects and summarised its findings in the NSW110/11Equipment for recovery of EPS across NSW 2011-13 Final Report. The report had detailed analysis of the types of units purchased by Councils, their processing capacity, energy consumption, and resource requirements. The report provided an invaluable assessment of different machines to inform the request for quote (RFQ) and project plan. It was decided that a heat extrusion machine was fit for purpose rather than a compaction machine due to greater volume density, less litter and reduced

transport costs. Three phase power was installed at the Transfer Station to run an EPS extrusion machine and a suitable site undercover was secured to store the EPS and machine. In the RFQ process, one supplier offered a free trial of their unit. The trial enabled operators to identify and troubleshoot issues such as overfeeding the machine (which can cause a build up material, causing it to melt and smoke); feeding only thin EPS, causing the material to come out in a liquid black form, and that processing capacity is affected by user skill level. End market material prices were requested in the RFQ process. The unit was purchased based on an assessment of processing capacity, end market material price and cost.

The target audience for the project was Monash residents, local businesses and residents in neighbouring Councils. Promotion of the project occurred through Council's monthly publication (Bulletin) delivered to every residential address, the council website and through the business e-newsletter (emailed to 3000 traders). All 7 neighbouring Councils were contacted to promote the free drop off service to their residents.

3 Project outcomes and findings

The project has resulted in a reduction of transport costs by 100%, a 75% net increase in customer numbers over the period of the project, and 5% specifically as a result of the communications strategy, improvements to the collection and source separation of EPS onsite, a secured end market for briquettes, increase of resource recovery of EPS by 33% and reduction of waste to landfill by 306m³ over 6 months (an extra 3 cages per month, at 17m³ per cage).

EPS was measured by volume prior to the introduction of the EPS extrusion machine. The extruded briquettes are weighed and Council receives a rebate based on tonnages recycled. Therefore, the increase in EPS diverted from landfill is an estimate measured using the conversion rate of 1 cage = 17m³ = 50kg. Transport costs have been eliminated as they have been absorbed in the rebate for the extruded briquettes. This was measured against invoices for transport costs prior to the introduction of the EPS machine. The project found that testing EPS machines prior to purchase is invaluable in assessing whether machines met the RFQ specifications

A survey was conducted at the Transfer station window to evaluate the communications activities (Bulletin, website and FOCUS business e-newsletter). The majority of EPS customers were existing Transfer station customers (91%), with word of mouth the second most effective communication method (4%). Of the customers surveyed, 5% were a result of the communications activities. Overall, the number of customers with EPS has increased by 75% (net) over the 9 month project period. The increase in EPS by 33% could be attributed to more customers bringing in small amounts for free (under ½m³). Further promotion of the facility to local industry and traders in the main activity centres will aim to boost the number of commercial customers to increase the volume/tonnages of EPS recycled. This project found that when working with white and non geometric images of EPS, early engagement with a graphic designer would benefit the delivery of communications activities.

The operation of the machine has become a part of the regular (daily or weekly) tasks performed by the Transfer station operators, minimising the operating cost of the machine. The operator costs vary substantially based on the operator skill level, speed, and efficiency in mixing thick and thin pieces of EPS for optimum consistency. These costs are offset as they are incorporated in standard transfer station yard duties. EPS briquette can be stored in the open, releasing premium undercover space for other resource recovery operations. The project has delivered considerable benefits in reduction of transport costs, the cost savings will justify the purchase of the unit within 3 years and the nominal briquette income can support other resource recovery activities in the Transfer Station.

4 Project Highlights

The project achieved the first Melbourne EPS Transfer station onsite recycling service with free drop off for residential amounts (under ½ m³). This has resulted in an increase of EPS recycling by 33%. In financial year 14/15 the Transfer station recovered 1827m³ of EPS (part of the year includes the introduction of the EPS extrusion unit), up 216% compared to 578m³ in FY13/14. The projected diversion rate for FY15/16 is 2378m³. The volume at landfill @\$150/tonne, which is equivalent to 1m³, saving \$350,000.

The project successes can be attributed to the established EPS recycling drop off system at the Monash Transfer station. This system had created a base level of EPS inputs for the project to build on; likewise, the existing EPS customer base has contributed to word of mouth promotion and the existing EPS operational set up incorporated the extrusion machine with minimal impact on the operation of the Transfer station. Transfer station staff can be commended on their ability to adapt to using an extrusion machine in their day to day duties and adjusting the technique to ensure consistent outputs. Transfer station staff are committed leaders in resource recovery and to build the Transfer station as a one stop shop for resource recovery.

The big wins from this project were the connections and networks accessed that informed the project planning stage and communications plan. Attendance at the Australasian Industrial Ecology Conference (Nov 14) introduced the project learnings' of the NSW EPA grant funded projects for Councils' recycling polystyrene. Following the conference, NSW EPA provided the final report that shared provided crucial data on processing times and power requirements and shaped the project planning. A key aim of the project was to communicate the free EPS drop off service to neighbouring Council residents and the positive responses from these Councils (sharing this information on their Council websites and with transfer stations) was a project highlight.

5 Conclusion and recommendations

The Diverting Polystyrene from landfill project achieved a long term, viable and cost effective solution to recycling EPS on site at the Monash Transfer station. The project required minor resourcing to deliver considerable increases in diversion of EPS from landfill. The project has created a lasting EPS recycling solution with the capacity to increase the amount of EPS received and recycled into the future. This project has demonstrated that EPS recycling can occur locally and may support future local industry development to process extruded briquettes in Australia (currently most material is shipping overseas). The project has demonstrated that a small investment in infrastructure can increase Transfer station efficiency and eliminate transport costs. It is recommended that metropolitan Councils consider the purchase of an EPS extrusion machine if the operation can be absorbed into current operator duties and there is a demonstrated and ongoing need (supply of EPS) for the service.

6 Supporting documentation

Figures

100% reduction in transport costs

75% increase in EPS customers (net increase over 9 month project)

33% increase in EPS recycled

306m³ EPS diverted from landfill (6 months)

5% new EPS customers as a result of communication strategy

3000 traders in Monash informed of the project (through the business e-news)

68,000 residential households informed of the project (through Council bulletin mail out)

1 cage EPS = 17m³ = 50kg (extruded EPS briquette)

7 neighbouring Councils informed of project (Stonnington, Knox, Boroondara, Kingston, Whitehorse, Glen Eira, Dandenong)

Tables

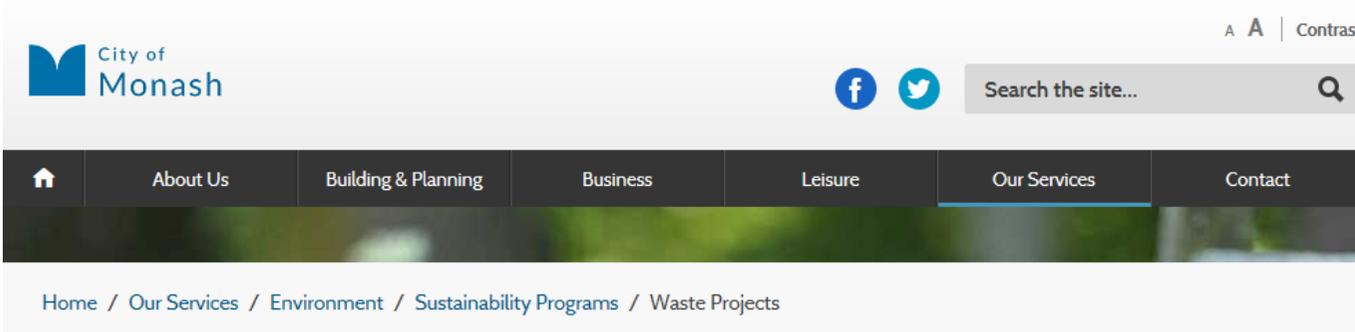
Project Targets	Project Results
Improvement in collections and source separation at the Transfer station through greater capacity to recycle EPS and store EPS briquette on site	The implementation of the extrusion machine has achieved reduced storage capacity and space required for EPS recycling as material is processed as part of weekly operations and is not dependent of external collections. EPS briquette is stored outside.
Secure end market for recycled EPS briquette	End market has been secured and transport costs built into the purchase price. The agreement at current purchase price is guaranteed for 2 years. Alternative companies have also approached Council to purchase this material.
Increased community awareness of the ability to recycle polystyrene at the Waste Transfer Station	Community awareness has increased, evident in the 75% increase in EPS customer numbers and 33% increase in EPS tonnages.
Increase resource recovery of EPS by 50% of current volumes	EPS volumes have increased by 33% by pre project volumes.
Reduction in costs of transport of EPS by 50%	Transport costs of EPS have reduced by 100%
Reduction of waste to landfill by 900m ² over 6 months	Reduction of waste to landfill by 306m ³ in 6 months

7 Project resources

Photos



Collateral



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Waste Projects

Resource Recovery Grant - Polystyrene extrusion machine

This project has funded the purchase of a polystyrene heat extrusion machine which shreds and melts EPS (expanded polystyrene) into a briquette. This material is easy to transport and is made into new products, from building materials to picture frames. Residents can now bring small amounts of polystyrene (clean, white, made of small balls) to the Transfer Station for free. Amounts over 1/2m³ are charged at \$5 per 1/2 m³ or \$20 for businesses. This project is funded by the Metropolitan Waste Resource Recovery Group (MWRRG).



Polystyrene and cardboard recycling

Polystyrene and cardboard recycling in Monash has recently received a boost, with two new machines introduced at the Monash Waste Transfer and Recycling Station.

Residents can now drop off household amounts of polystyrene for FREE at the transfer station. A new compactor has been installed, which heats and then shrinks down polystyrene for recycling. For amounts above 1/2 cubic metre, a fee of \$5 per 1/2 cubic metre applies.

People can also now drop off any amount of cardboard at the transfer station for FREE. A new compactor has increased Council's capacity to accept and store cardboard. Cardboard can now be compacted on site, which is the first step in cardboard being turned into sustainable products.

The Metropolitan Waste Recovery Group funded the polystyrene compactor, while the Australian Packaging Covenant and Sustainability Victoria paid for the cardboard compactor.

The Monash Waste Transfer Station and Recycling Station is at 380 Ferntree Gully Rd, Notting Hill. It is open seven days per week (except public holidays), from 7.30am-4pm.

For more info:

- www.monash.vic.gov.au/monash-waste-and-transfer-recycling-station
- 9518 3767

8 Glossary

Use this section to define any terms specific to your project

Term	Definition
EPS	Expanded Polystyrene
PS	Plastic Code (polystyrene)
RFQ	Request for Quote
Transfer station	Monash Council Waste & Recycling Transfer Station

Final report sign off

The sign off of the final report is required from the project manager and department director/manager prior to submission.

Name	Position	Signature	Date
Ossie Martinz	Director , Infrastructure		
Joe Lunardello	Manager, Waste Services		
April Williams	Waste Services Project Officer		