

GLASS FINES RECYCLING

Case Study:

Kurrajong Recyclers, Wagga Wagga



This Case Study was developed based on other Australian Packaging Covenant (APC) template recycling guides provided by NSW EPA to EC Sustainable Pty Ltd as designed for other Australian Packaging Covenant (APC) recycling initiatives. The content was edited in collaboration with the NSW EPA, following extensive action research during the NSW EPA Glass Fines Recycling Pilot Program in 2012-14.

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INTRODUCTION

Welcome to the world of glass fines recycling, the process of turning glass fines into a Recycled Crushed Glass (RCG) product. Glass represents around 30% to 40% of the recycling stream handled by MRFs. Glass fines make up a significant % of this material, and in the past the material has not been recycled. Glass fines can be reprocessed in usable products by turning the glass fines into a Recycled Crushed Glass (RCG) product that is typically defined as a product of 5mm or less. In NSW, RCG have been used for various applications, such as pipe bedding, roadbase and sand bags for run-off water control. This case study highlights one grantee's experience of crushing glass and marketing RCG.

Kurrajong Recyclers, Wagga Wagga

Introduction

Prior to being awarded a NSW EPA grant, Kurrajong Recyclers' (KR) materials recycling facility (MRF) processed all glass accepted from the kerbside recycling stream. Whole and broken glass containers were colour sorted into high value cullet which was transported for recycling. This accounted for about 30% of the total glass coming into the facility. The remaining 70% of material was separated as glass fines and further sorted through a secondary process in the MRF to remove residual waste, before being separated into bins. Although the secondary sorting of glass fines had originally been intended to allow reuse or recycling, no market had been secured for this material and stockpiles were eventually disposed to the local landfill.

The project aim for Kurrajong Recyclers was to construct a glass crushing facility adjacent to the existing MRF. In developing the project, the organisation undertook a field study to the NSW central coast and north coast to research existing glass crushing facilities. This informed the design and development of the eventual facility. The facility was designed to be capable of accepting residual mixed glass cullet from the MRF with a particle size of less than 50mm. The process was originally designed to produce two grades of product, being a fine sub 2mm sand and a larger sub 5mm aggregate. To reduce the amount glass being sent to landfill, a glass crushing facility was constructed adjacent to the MRF. The facility includes a crusher; storage bays; conveyers, hoppers and screens; a covered area with a system for controlling dust; and a mechanism to separate other materials from the waste glass stream.

Funding Request

\$267,500 was requested and the estimated full cost of the facility is \$ 565,000.

Approximately \$30,000 per year is spent on running costs, 50% of which is required for repair and maintenance - for replacement hammers and conveyor belts and general repairs and maintenance.

Planning – markets and equipment

The processing equipment eventually procured was an Andela GP1HD glass pulveriser, combined with an Impact Air zig zag separator, an Andela trommel and an infeed hopper.

The process involves dirty glass being fed into the infeed hopper where it then passes under a magnet to separate ferrous metals before moving into the zig zag air separator to take out the light fine material (shredded paper and light plastics). A pulveriser is used for size reduction before a trommel separator is employed to separate and size the glass-aggregate and to sort out any gross contamination. A series of screens (5mm screen followed by 10mm screen) further sorts the material. Output from the 10 mm screen is then returned to the pulveriser for a second time, whilst the output from the 5mm screen moves across a 3mm vibrating screen, which sorts out a 3-5mm product and a sub 3mm product. Clear glass is able to be sorted separately and screened again through a separate two deck vibrating screen into an ultra-fine 2mm and 0.7mm particle size. The 'flexible impact system' of the pulveriser is designed to eliminate the grinding process typical of traditional hammer mill equipment thus reducing the impact of wear and associated maintenance. The resulting aggregate is free of sharp edges and has a 'cubic' particle shape, therefore is promoted as being safe to handle.

They experience about 3.5% contamination - contaminants have included organic matter, plastics, non-ferrous metals, paper and EPS.

The intended market for the crushed glass was civil works, specifically use in road base and drainage applications. KR also investigated options for usage in the landscaping industry. It found markets for the product once it got the waste exemption and the Road and Maritime Services' specifications were met. RCG has been sold for use in decorative concrete paths and to make imitation stone walls panels.

Benefits

Kurrajong Recyclers (KR) has been operating for about 55 years employing 90 people (of which 55 are full-time). Two people operate and maintain the glass crushing equipment which started operating in September 2014.

Kurrajong Recyclers, lists the benefits of producing RCG as:

- Reduced the amount of material going into landfill.
- Transport Cost savings.
- Adding a product to their range for sale



Key facts

Glass and glass fines recycling feedstock	1,800tpa (based on 300 tonnes in the first two months)
Estimated current annual tonnage of RCG / actual diversion rate	1,740 (based on deducting contamination rates of 3.3%-3.5%).
Product size	< 3mm and 3-5 mm available. Some customers asking for 10mm
Proposed diversion efficiency	\$100/tpa diverted
Current value of landfill diversion savings	\$37,770 (\$100 disposal cost x 290 tonnes of RCG product)

KEY LEARNINGS

- Kurrajong Recycling has found the need to convince civil contractors and bitumen contractors to try the RCG alternative.
- The use of RCG has spread by Word of mouth. They have a sales representative who promotes the product and distributes pamphlets.

- Investigate markets before starting production - KR wanted to sell to the civil contracting market investigated it before they started.
- Longer timescales were needed for something that was relatively new and purpose built. The milestones for the initial project plans and application went to plan but longer timescales and / or contingency plans to cover the construction through to completion would help.
- Time is needed to organise and gain results from data testing.
- Work with local government to approve the use of RCG in public assets.
- Installing the magnet initially helped contamination management.
- KR would have made the whole plant bigger to be able to process more glass.

Sales and marketing

“Take time to do plenty of research and get samples out to many local business. Really promote the product - before starting production. Build in time to produce information booklets.”

