

# Hospitality Pubs and Clubs Glass Recycling Project Victoria

## Final Report & Business Case

*27 October 2009*



**A National Packaging Covenant funded project**

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**Disclaimer**

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**Final Report**

**Hospitality Pubs and Clubs Glass  
Recycling Project Victoria  
Packaging Stewardship Forum of the Australian  
Food and Grocery Council**

27 October 2009



**PACKAGING  
STEWARDSHIP  
FORUM**

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## EXECUTIVE SUMMARY

The Packaging Stewardship Forum of the Australian Food and Grocery Council, with funding from the National Packaging Covenant, project managed and jointly funded a Hospitality Pubs and Clubs Glass Recycling Project targeting venues within Melbourne City Council area which concluded end June 2009.

The Hospitality Pubs and Clubs Glass Recycling Project has been effective in boosting glass recovery in Melbourne's hospitality sector by one thousand, one hundred and eighty seven (1,187) tonnes as at the end of September 2009 this equates to more than 6.7 million stubby bottles.

These significant tonnages were diverted through the use of the Bottlecyclor on site bottle crushing technology and collection service, coupled with education and orientation for staff on the use of the machine .

Bottlecyclor Australia Pty Ltd is an Australian company which utilises a proprietary compact Bottlecyclor machine to crush glass bottles on site and deliver the crushed glass into a 60L bin in the base of the machine which holds the equivalent of two 240L conventional recycling bins. The Bottlecyclor machine can be located inside, or adjacent to a bar area, and reduces the volume of glass waste to be removed by crushing the glass into recyclable pieces. Bottlecyclor also provide a collection service which delivers materials to Visy Recycling in Laverton, Victoria.

The recovery of one thousand, one hundred and eighty seven (1,187) tonnes of glass was achieved as a direct result of free two month trials of the Bottlecyclor machine and collection service. in eighty five (85) bars in the Melbourne area. The installation of the machines was coupled with staff briefings and the provision of educational and promotional material to facilitate a culture of recycling within the participating venues.

Due to their participation with this project, an increased level of commitment and responsibility for the environment has developed at hospitality venues in Melbourne where management and staff experienced first hand the benefits that using the Bottlecyclor on site glass crushing technology can offer. This is demonstrated by the uptake rate of venues continuing with the Bottlecyclor service post trial. Sixty nine (69%) of the 85 trial venues continued with the Bottlecyclor service on an ongoing basis post trial. As a consequence, it is anticipated that on an annual and ongoing basis, an additional 1,000 tonnes of glass will be recovered for recycling.

A project evaluation and business case analysis conducted by Professor John Cary of Victoria University in November 2007 (see Appendix 1) identified that for venues with large volumes of bottle glass, on-premise crushing is more cost effective than disposal to conventional mixed recycling or landfill. Smaller venues will need to weigh the convenience and value of having more space, more efficient use of staff time, ease of handling and doing the right thing for the environment, against the cost of the service. Some of the venues who were not willing to bear the upfront cost of continuing with the Bottlecyclor after the two month free trial, have now moved to co-mingled recycling services collected by their local council.. This also demonstrates that a culture of recycling is

spreading through the industry, even if some venues did not take up the Bottlecyclers long term.

Project partners Foster's, Lion Nathan and the Australian Hotels Association have promoted the trial offers and outcomes of the project throughout the industry to their customers/stakeholders.

## **BACKGROUND**

The Packaging Stewardship Forum (PSF) of the Australian Food and Council was established in May 2006 to provide a product stewardship vehicle for its members, Australia's major beverage manufacturers and packaging suppliers, to increase the recovery and recycling of packaging materials and reduce packaging litter.

While glass recovery and recycling from households is high (recovery or collection rate of 26%), "away from home" recovery is only 22%.<sup>1</sup> As a key consumer of glass, the hospitality sector was identified by the PSF as providing a significant opportunity to increase the recovery of "away from home" glass.

There are a number of factors contributing to low glass recovery rates within the hospitality sector, ie:

- The lack of space - resulting in minimal space available for recycling infrastructure.
- Time poor and often transient bar staff working in often crowded and busy environments

There has been a significant trend towards consumption of ready to drink bottled spirits and boutique beers (away from on tap) and changes in licensing regulations has meant more boutique type bars are obtaining licenses and primarily selling bottled drinks.

Subsequently, the PSF identified that the Bottlecyclers on site glass crushing technology and collection service had the capacity to dramatically increase glass recovery from the hospitality sector, while also addressing occupational health and safety (OH&S) issues associated with glass handling.

In February 2007, the PSF successfully sought funding to implement a Hospitality Pubs and Clubs Glass Recycling Project in Victoria through the National Packaging Covenant (NPC). The NPC is Australia's peak instrument for managing the environmental impacts of packaging waste.

The PSF managed the delivery of the project on behalf of the National Packaging Covenant and the Victorian Government in conjunction with Bottlecyclers Australia Pty Ltd.

The project commenced in July 2007 and concluded in August 2009..

## **INTRODUCTION**

The aim of the project was to develop best practice recycling and resource recovery in the hospitality sector through both improved practices and education.

The objectives of the project were to:-

- boost glass recovery in the hospitality sector
- educate and motivate staff to adopt a recycling culture

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<sup>1</sup> See: <http://www.afgc.org.au/cmsDocuments/Beverage%20Packaging%20Quantification%20Study.pdf>

- demonstrate the business case to the hotel/hospitality industry on the benefits of using a Bottlecycler machine, recovering glass (and potentially other resources) as an integral part of their business.

While the principal aim of the Hospitality Pubs and Clubs Glass Recycling Project was to significantly improve the recovery of glass from the hospitality sector, it also had additional aims, through the use of Bottlecycler machines, to educate hoteliers and staff about:

- improvements to their work practices
- improved occupational health and safety standards with handling of glass
- reduction of noise when handling glass

## **PROJECT DEFINITION**

The Hospitality Pubs and Clubs Glass Recycling Project offered participating venues a two month trial of a bottle crushing machine provided by Bottlecycler Australia Pty Ltd that included operational training for staff as well as the collection of their glass material. The Bottlecycler machine in situ glass crushing technology addresses many issues associated with glass handling. It also provides space saving and noise abatement benefits as well as providing a clean glass stream which is a desirable material for recyclers. The trials provides an opportunity for venues to experience, first hand, the little known technology of the onsite bottle crushing machine and its potential benefits for their business.

At the end of the trial period, trial venues had the option to enter into a long term agreement with Bottlecycler for the provision of services on an ongoing basis. Staff education and communication resources were provided as an integrated component of the project to address the issue of communicating the glass recycling message to permanent and casual staff. Displaying the communication material sends a consistent message that contributes to a positive cultural shift toward recycling within the hospitality industry.

### ***Aim***

1. To increase the diversion of glass within the hospitality sector by between 1536-2324 tonnes over 18 months.
2. To offer ninety (90) machines for sponsored two month trials of the Bottlecycler glass crushing machine and collection to eighty five (85)\_hospitality venues in Melbourne.
3. To provide education and communication resources about recycling within the hospitality sector. Examples of the communication material pictured (Fig 1).



Figure 1: Marketing material used as part of the Hospitality Pubs and Clubs Glass Recycling Project

## Locations

The majority of venues were in the Melbourne metro area with other inner urban localities such as Fitzroy, Moonee Ponds, Prahran, Toorak, St Kilda and Brighton participating in the trials (for a list of participating venues see Appendix ??).

## Bottlecyclor

Bottlecyclor Australia Pty Ltd is an Australian company which utilises a proprietary compact Bottlecyclor machine to crush glass bottles on site and deliver the compacted crushed glass into a bin in the base of the machine which holds the equivalent of two 240L conventional recycling bins.

INSERT NEW FIGURE OF THAT BOTTLECYCLER PICTURE OF THE TWO 240L BINS AND THE BOTTLECYCLER BIN.

The Bottlecyclor machine can be located inside, or adjacent to a bar area, and reduces the volume of glass waste to be removed by crushing the glass into



recyclable pieces. The average content of ten small bar bins fit into one compact, 60L wheelie bin. Once the bin is full it is wheeled to the loading bay for pick up by the Bottlecycler collector and delivered to Visy for glass recycling.



**Figure 2: Bottlecycler bottle crusher and collection bin**

## **COLLECTION & MATERIAL ANALYSIS**

Venues targeted for participation in this project were those which did not already have access to recycling services or where the recycling of glass could be dramatically improved. Those that were identified as generating large volumes of glass were also targeted in order to obtain greater recovery rates for the project.

Of the trial venues, the Qantas Club Lounge at Melbourne Airport had the highest recovery of glass at an average rate of 8 tonnes a month.

Nightclubs, such as the Night Cat and Precinct generated 3 tonnes and 3.6 tonnes per month respectively with most of the other venues recovering an average of 1 tonne of glass per month. The original estimates for materials diversion for the project were based on an average of between two (2) to three (3) tonnes of glass per month per venue. This average was not demonstrated by venues that participated in the project with an average of one tonne generation per month were being achieved.

Bottlecycler glass has minimal or no contamination due to the nature of its operation. The company has its own trucks that collect only glass which is delivered to Visy's Laverton plant where optical sorting technology is used to colour sort glass pieces up to 10mm in size into separate colours ie amber, flint (clear) and green..

### ***Markets/Outlets for Materials Recovered***

Visy's has reported that 60% of the glass they receive from Bottlecycler venues is recycled, with 40% being stockpiled awaiting the development of alternate glass fine markets.

There are a number of projects in progress throughout Australia that are developing and demonstrating alternate use products for glass fines. These include the use of glass as a sand replacement in concrete, as an aggregate in asphalt or concrete products, insulation, filtration, medium, pipe embedment and other non-load bearing construction products.

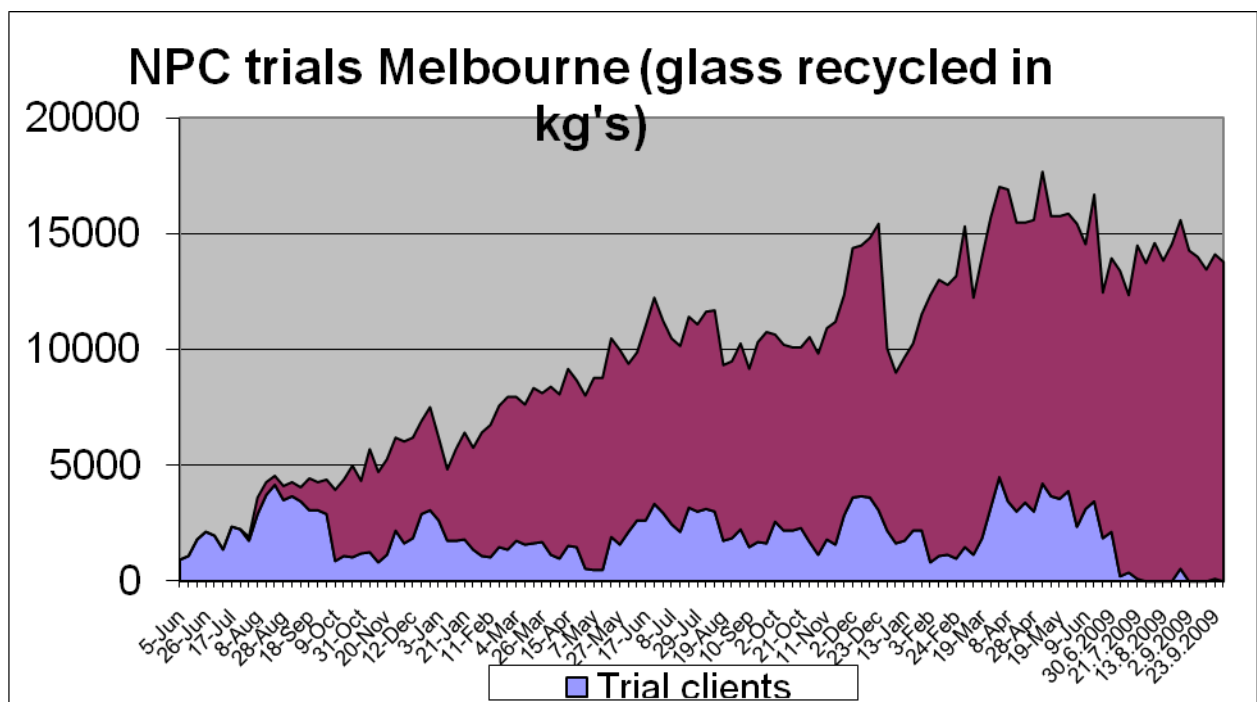
There are cases where these products have already been trialled, used and tested by individual companies and other joint ventures, however commercial sensitivity appears to be impeding the broader development of markets due to the companies involved wishing to maintain their own proprietary ownership of processes.

The PSF is currently working with a number of local governments, government departments and road authorities to demonstrate the use of crushed glass in road base and footpaths. Our objective is to trial, test and demonstrate its use with a view to the development of specifications or the use of crushed glass. It is expected that draft specifications will be completed for NSW and Victoria in late 2010

**Outcomes**

Key outcomes from this project have been the installation of ninety (90) bottle crushing machines into eighty-five (85) hospitality venues to enable their participation in free two month trials of the Bottlecycler machine and collection service.

As a direct result of their participation, 1,187 tonnes of glass have been recovered for recycling by the end of March 2009 with a projected recovery rate of an additional 1,000 tonnes over the next twelve (12) month period post project completion (see Figure 3 below). 1,187 tonnes of glass equates to 6.7million stubbies, or 2.3 million wine bottles.



**Figure 3: Cumulative recovery of recycled glass (tonnes), NPC Trials Melbourne**

At the completion of this project, 69% of the trial venues have entered into their own long term agreement with Bottlecyclers Australia Pty Ltd (for a list of venues that have converted across to ongoing service see Appendix XX).

The Hospitality Resource Recovery Project Evaluation Report undertaken by Professor John Carey of Victoria University identified clear evidence that 'the project had been effective in boosting the recycling of glass in the hospitality sector' and that venue staff had been motivated to adopt a recycling culture within the workplace (see Appendix 3).

As a part of the evaluation, a business case analysis was conducted on ten (10) of the participating venues. The business case identified that for venues that generate large volumes of glass, on site crushing was more cost effective than disposal to conventional mixed recycling. Smaller or less busy premises also gained non-cash benefits such as saving in staff time and space in their venues.

### ***Community Acceptance***

Members of the community have been very receptive to the use of the Bottlecyclers and the initiative of recycling being implemented behind the bar. Staff members who have been interviewed state that they are happy to see recycling in the venue as they don't see much recycling away from home.

## **KEY LEARNINGS**

### ***Highlights***

As noted, the uptake of the project within hospitality venues within Melbourne has been pleasing, with 69% of participating venues taking on long term leases to use the Bottlecyclers technology and collection service post trial.

Bars that are suitable for successful uptake of the Bottlecyclers machine should be estimated by their glass generation, not necessarily size. Many smaller boutique type bars serve ready to drink spirits and bottled beers making them higher generators of glass than many larger bars that serve tap beers and premix soft drinks. Further, these venues are often space constrained, making the Bottlecyclers option attractive.

Quotes from bars managers/staff:

***'We love using the machine; we had lots of issues previously with handling bottle.'***

**Madame Brussels**

***'It is fantastic, we had identified issues with handling glass. The trial allowed us to look at the practical side as oppose to just the financial side.'***

**Australian Club**

One of the participating venues, the 'Precinct Bar' Melbourne, which has two machines in situ, considered the location of the machine within their renovation plans and 'built in' a specific space at the bar areas for each of the machines. Also on display is an educational poster on glass recycling and signage on the

machine. The management of the 'Precinct Bar' have stated that 'less space is taken up by the Bottlecycler. It is also more efficient for staff when it is busy as there is less handling involved.



**Figure 4: Space built into the Precinct Bar during renovations to accommodate the Bottlecycler machine**

***'It churns through the glass – it's great'***  
**Local Taphouse**



**Figure 5: Proprietor of the Local Taphouse using the Bottlecycler machine**

### ***What Went Wrong***

During the Spring Racing Carnival in Victoria, Bottlecycler staff were busy working with major racing venues implementing recycling for a period of four weeks. This focus meant that the take up of trials within the hospitality sector lost momentum and the final milestone deadline was subsequently not met. It should be noted that the installation of Bottlecycler systems at Flemington, Caulfield and Moonee Valley racecourses during the Carnival yielded an additional recovery of twenty five (25) tonnes of glass recycled, tonnages which would have previously gone to landfill. (Note: these tonnages are not included in the recovery data for this project)

This situation, though positive for recovery of glass, led to a delay in the projected installation of trials for the Hospitality Pubs and Clubs Glass Recycling Project. The flow on effect of the delay in trial installations meant that eighteen (18) venues were still within their trial period when the project was supposed to conclude and these trials were yet to be completed.

An extension request was submitted to the NPC in December 2009 which was granted with reporting deferred until venue trials were completed and data collated.

The result of the project extension proved fruitful as it provided the opportunity for the project to achieve the stated objectives by recovering one thousand, one hundred and eighty seven (1,187) tonnes of glass by the end of August 2009.

### ***Market Response***

Overall the market response from trial venues in the hospitality sector has been positive towards using and committing to long term use of the machine.

It is acknowledged acknowledge that there is no one size fits all solution to glass recycling. However, the Bottlecycler technology addresses a number of issues related to handling of glass for the hospitality sector in regard to OH&S issues and providing an efficient way to minimize handling, whilst recycling what can at times be a dangerous material, and for many businesses these are important issues.

### ***Result of Learnings***

- Identifying suitable premises that are more likely to obtain economic or space saving benefits from using the Bottlecycler bottle crushing and service system. An initial assessment of glass generation rates in potential trial venues means that installations will be specifically targeted at venues that are more likely to achieve economic benefit along with the other advantages of using Bottlecycler technology.
- Displaying of educational material at the time of trial installation in a format that the hospitality sector is accustomed to presents environmental information in an easy to understand format that staff can relate to. thereby facilitating a better understanding and culture of recycling.

- Business case report prepared by Professor John Cary of Victoria University provides an objective evaluation and case study on ten venues that participated in the project.

## **RECOMMENDATIONS**

1. Set realistic timeframes for implementation of project milestones allowing for factors that may impact on delivery such as the Christmas/Holiday and Racing season. The hospitality industry is an industry that is busier during these times making it difficult to implement any changes in their work practices.
2. Realise the importance of undertaking an initial site assessment to estimate level of glass generation within venues prior to installation of trials.
3. Ensure that all educational and promotional materials are put in place within the venue at the same time as the Bottlecycler machine is installed to educate staff and promote the new recycling initiative at the time it commences.

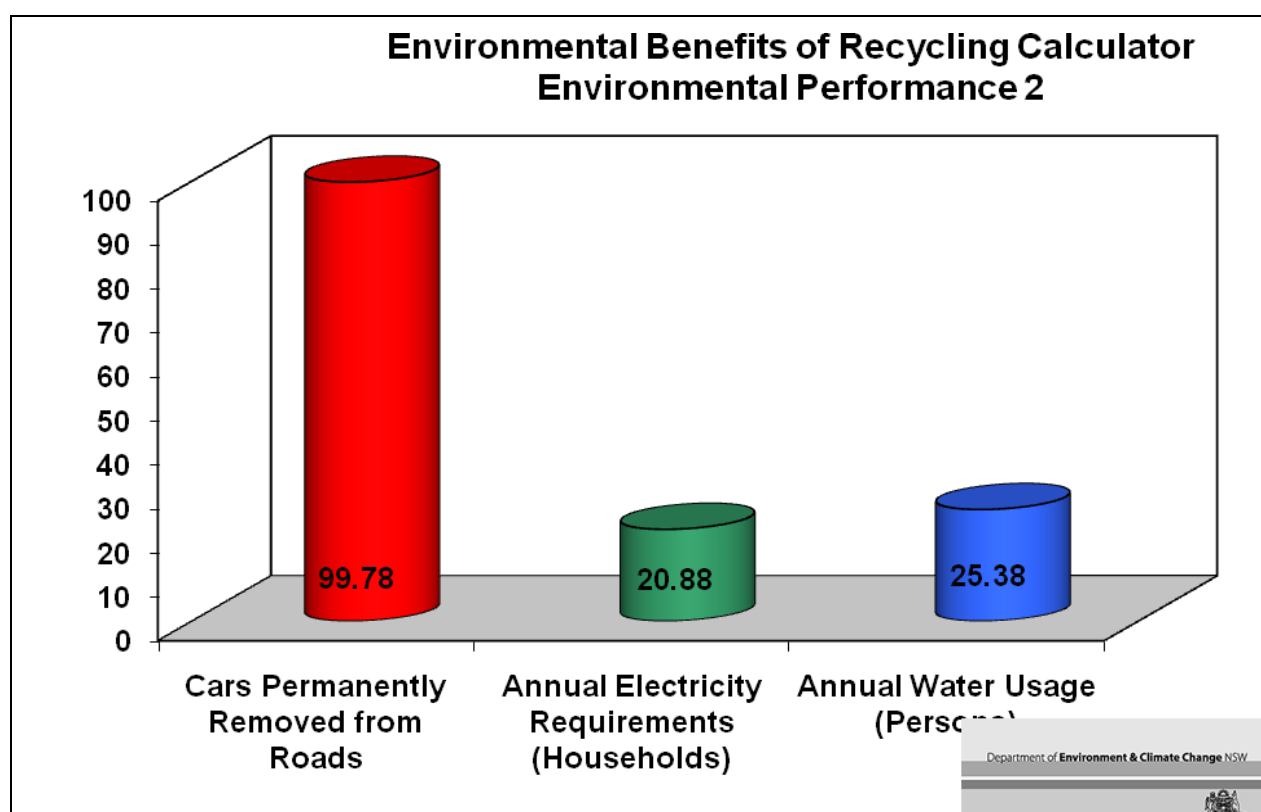
## **BUDGET BREAKDOWN**

Bottlecycler Trial Rentals	\$71,800.00
Educational Materials	\$ 6,868.75
Victorian University Evaluation Report	\$14,900.00
<b>TOTAL COSTS</b>	<b>: \$93,568.75</b>

## CONCLUSION

1,187 tonnes of glass has been recovered for recycling as a result of this project, with an additional 1,000 tonnes projected to be recovered over the next twelve months, equivalent to 6.7million stubbies. The environmental benefits gained by recycling this amount of glass equates to:-

- the permanent removal of almost 100 cars from the road
- saving enough power to that used by 21 homes in a year;
- saving enough water to cover the annual usage of more than 25 people.



**Figure 6: Environmental Benefits Graph** (Environmental Benefits Calculator DECCW NSW)

There was initial scepticism within the industry regarding the benefits that Bottlecyclor could deliver. The sponsorship of free trials has meant venues have a chance to experience how the machine and service works for them and the benefits they can achieve, whether they are saving money, space, time, reduced OH&S risks, noise abatement or environmental benefits.

Project partners Foster's, Lion Nathan and the Australian Hotels Association promote the trial offers and project outcomes throughout the industry to their customers/stakeholders.

Sixty-nine (69) percent of the venues that participated in trials entered into a long term arrangements with the Bottlecyclor to continue using the machine and collection service for their glass recycling arrangements.

According to the Evaluation Report that was produced by Victoria University, 6 of the 10 trial venues who took up a long term arrangements for use of the Bottlecycler did so for more than just economic reasons. Some venues experienced benefits that were of value to them, such as saving staff time in handling glass, reduced OH&S risks, noise abatement or space savings. These benefits in such cases outweighed or off set the additional costs of leasing a Bottlecycler machine.

Bottlecycler is good business for in situ bottle crushing technology in that it provides an efficient and economical process for recycling glass in busy bar environments, particularly those that generate large quantities of glass.

Overall, the project has been successful in implementing all of the milestones as agreed and has influenced members of the hospitality industry in relation to the economical and environmental benefits of recycling whilst recovering 1,187 tonnes of glass for recycling at the conclusion of project implementation and reporting.



## APPENDIX 1– TABLE OF VENUES

**Table1: Trial venues, number of Bottlecycler units installed and venues which converted to contract post trial (X = non conversion √ = conversion)**

	Venue	Units	Converted Clients
1	Windsor Hotel	1	
2	Heavens Door	1	YES
3	One Six One	1	√YES
4	Hilton Hotel	2	YES
5	Madam Brussels	1	√YES
6	Motel	1	
7	Fix Bar	1	YES
8	Night Cat	1	YES
9	Aqua el Vino	1	
10	Qantas Lounge	2	YES
11	Pure	1	YES
12	The Greyhound	1	YES
13	Mercure Hotel	1	YES
14	Collins Quarter	1	YES
15	Cubby House	1	
16	Box Hill Tafe	1	YES
17	The Australian Club	1	YES
18	Quaff	1	YES
19	E.T.'s	1	
20	Fox In the Box	1	
21	Gin Palace	1	YES
22	Citigate Melbourne	1	YES
23	Red Spice Road	1	YES
24	Eurotrash	1	YES
25	Billboard	1	YES
26	Old Melbourne Gaol	1	YES
27	Rooftop Bar	1	YES
28	Tramp Niteclub	1	
30	Lalor Bowling Club	1	

	Venue	Units	Converted Clients
31	Precinct	2	YES
32	The Local	1	YES
33	Silk Road	1	YES
34	Naughtons Hotel	1	YES
35	Metro Nightclub	1	
36	Strike Bowling Bar	1	YES
37	Dreams Club	1	YES
38	Crosskeys Hotel	1	YES
39	M Bar	1	
40	Rubys Pizza Restaurant	1	YES
41	Red Eye Bar	1	YES
42	Shamiana Restaurant	1	
43	Vineyard	1	
44	Vue De Monde	1	YES
45	Leonda by the Yarra	1	
29	Crown Casino	3	
46	Bistro Thierry	1	
47	Nacional	1	YES
48	3 Station Pier	1	YES
49	Colombo's	1	YES
50	Neverwhere	1	
51	Priscilla's at 153	1	YES
52	The Prince	1	YES
53	The London	1	
54	The Matchbar	1	YES
55	Half Moon	1	YES
56	Band Room (The Prince)	1	
57	Honey	1	
58	The Blue Stone	1	
59	Old Spice Road (Momo)	1	YES
60	Vedette Night Club	1	YES
61	Kingswood Golf	1	
62	Orange Whip	1	YES

	Venue	Units	Converted Clients
63	K Box	1	YES
64	Again	1	YES
65	Pensione	1	
66	The Italian	1	
67	Cecconi's canteena	1	YES
68	Pug Mahones	1	
69	Albert Park Hotel	1	YES
70	The Edge (Lambys)	1	YES
71	Princess Park Bowls Club	1	
72	Barley Corn Hotel	1	
73	Deco Wine Bar	1	
74	Corkmen Irish Pub	1	YES
75	Max's Restaurant	1	YES
76	Republicca Amello	1	
77	Entertainment 4	1	
78	Strike Bowling Bar Glen Waverley	1	YES
79	Sebel Heritage	1	
80	Botanical Hotel	1	YES
81	Mooney Valley Bowling Club	1	
82	Etihad Stadium	2	YES
83	Moonee Valley Sporting Club	1	
84	Grovedale Bowling Club	1	
85	Melb Cricket Ground	2	
	<b>Total units</b>	<b>92</b>	

**APPENDIX 2**

**THE BUSINESS CASE FOR BOTTLECYCLER**



## EXECUTIVE SUMMARY

The business case for using Bottlecycler in situ bottle crushing technology is that it facilitates efficient and economical process for recycling glass in busy bar environs, particularly those that generate large quantities of glass. Sponsored trials provide venues with the opportunity for venues to experience the benefits the technology has to offer within their own business environment prior to making a financial commitment. The trial process has resulted in 69% of the participating venues entering into long term arrangements with Bottlecycler Pty Ltd to continue using the machine, which will lead to ongoing glass recovery for recycling.

Venues that generate large quantities of glass experience a greater economic benefit from using the Bottlecycler technology (eg Qantas Club at Melbourne Airport, Night Cat Night Club and Precinct Bar) whilst many of the venues that generate smaller quantities experience other benefits such as staff time savings due to minimising the time spent handling and disposing of glass, addressed OH&S issues, noise abatement and space saving advantages.

It is acknowledged that sponsored trials cannot continue indefinitely. However there is still a need to address the level of cynicism that exists within the sector. Sponsored trials facilitate this process by offering hands on experience using the machine within the workplace. The current 69% long term take up of the machine post trials demonstrate the benefits are achieved by a variety of venues that experience the use of Bottlecycler, on site bottle crushing technology.

There is a case for the continuation of trial offers of the Bottlecycler or similar technology in areas outside where sponsored trials have already existed (eg regional locations or other states). This is suggested to engender a broader acceptance and abate scepticism that exists within some sectors of the hospitality industry regarding the Bottlecycler technology. This should be undertaken with a promotional campaign in industry publications and exhibitions at trade expos to promote the use of and facilitate the acceptance of in situ bottle crushing technology as an efficient and cost effective way to recycle glass for the hospitality sector. Once there is general acceptance of the technology by the hospitality sector, trials will no longer be necessary. It is envisaged that this should be achieved in around twelve (12) months.

## **Introduction**

The Hospitality Pubs and Clubs Glass Recycling Project aimed to implement efficient resource recovery for the hospitality sector through improved practices and education.

A main objective was to facilitate the implementation of suitable infrastructure that would dramatically improve the quantity of glass that is recovered for recycling from the hospitality sector.

Identified issues that needed to be addressed by this project to improve the recovery rates of glass were:-

- Problems associated to limited space behind bars for recycling infrastructure.
- Need for a system that has minimal impact on the limited space available back of house for extra bins to contain recycling separate from waste.
- Communications material and a system that is easy to use for time poor, and often casual employees.
- Attitudes to recycling often exhibited by staff. The value of recycling often being the furthest thing from their mind whilst working in such a busy environment.

It was identified that the Bottlecycler technology, which is a machine that provides on site crushing of glass bottles as a clean non contaminated material source that is then recovered for recycling could address the aforementioned issues

The machine takes up minimum space behind or adjacent to the bar, minimises OH&S issues related to glass handling and reduces the amount of space that is needed for storing recycling bins in the waste management areas.

## **PROJECT OVERVIEW**

The Hospitality Pubs and Clubs Glass Recycling Project provided eighty five (85) participating venues a two month trial of a bottle crushing machine provided by Bottlecycler Pty Ltd that included operational training for staff as well as the collection of their glass material. The Bottlecycler machine in situ glass crushing technology addresses many issues associated with glass handling as previously mentioned. It also provides space saving and noise abatement benefits as well as providing a clean glass stream which is a desirable material for recyclers.

The trials were coupled with the distribution of education and communications materials that were developed by PSF in consultation with members of the hospitality sector.

At the end of the trial period, venues then had the option to enter into a long term agreement with Bottlecyclor, sixty nine percent (69%) of these venues who participated in the trials opted to continue to use the machine which provided an opportunity to experience the little known technology first hand. Many of which also sought other initiatives to reduce their environmental footprint as a result of developing a recycling culture.

Staff education and communication resources were provided as an integrated component of the project to address the issue of communicating a consistent message to transient and casual staff. Displaying the communication material sends a consistent message that contributes to a positive cultural shift toward recycling within the hospitality industry.

Average reported recovery rates from licensed venues is around one (1) tonne per month per venue with some of the larger/busier venues recovering up to eight (8) tonnes of glass per month (ie Qantas Club Melbourne Airport.).

The Hospitality Pubs and Clubs Glass Recycling Project concluded introduction trials of on 27<sup>th</sup> March 2009. Throughout the project, 90 Bottlecyclor machines were installed in a total of eighty five (85) venues for a two month trial using the Bottlecyclor machine with eighteen (18) of these venues still within their trial period. Reporting on this project therefore delayed until all trials were concluded and data reported..

From these venues 1,187 tonnes of glass was recovered for recycling as a direct result of this project with a further 1,000 tonnes estimated to be recovered over the next 12 months.

Recent information from the Federal Glass Manager from Visy where the Bottlecyclor glass is delivered has stated that 69% of the glass delivered to their plant is being recycled. The remaining 40% is being stockpiled for use in alternate glass fine markets that are pending.

*NOTE: There are currently a number of projects underway throughout Australia in which the PSF and/or National Packaging Covenant is participating that are working on the development and establishment of alternate uses and local markets for glass fine products which will be able to recycling the 40% of glass that has been recovered but not yet recycled.*



## **BUSINESS CASE**

Bottlecycler quietly reduces the volume of empty bottles by 80% by crushing the glass into recyclable pieces within the machine. Glass handling is at a minimum as the bottles go straight into the bin that is collected by the truck. The 60L bin is then wheeled outside directly to the waste area instead of carrying crates or small bar bins outside then having to empty them into another bin or large waste skip. The machine also addresses many of the glass related OH&S issues and possible noise complaints.

Professor John Cary of Victoria University prepared an evaluation report on the first ten (10) venues participating in the Victorian Pubs and Clubs Hospitality Recycling Project, in which he states 'venues that have large volumes of bottled glass find that onsite bottle crushing is more cost effective than conventional recycling or waste collection' Appendix. 3

Professor Cary also stated that there are non cash benefits obtained from on site bottle crushing achieved for many smaller venues or venues that don't necessarily generate large quantities of glass that outweighed the cost difference of conventional recycling or general waste collection. The volume reduction associated with on premises bottle crushing was found in most cases to reduce glass handling and saved staff time with the increased recycling efficiencies. This equates to staff time saved equalling money saved.

Without the opportunity to experience a sponsored trial of the Bottlecycler technology within their own business situation, most of these venues would not have considered using the machine.

The rationale for offering sponsored trials of the Bottlecycler machine is that many businesses view the monthly fees, which are an average \$300 to \$400 per month, as an additional cost to their business, without considering other potential advantages that could be gained including the opportunities it provides for economic savings such as reduced general waste costs and staff time savings. This perception creates a barrier to most managers as they only consider upfront costs without including other possible benefits and financial offsets.

Sixty nine percent (69%) of the venues who participated in the project trials converted to becoming long term customers of the Bottlecycler demonstrating the business case for offering sponsored trial periods. As can be seen in the graph below, the percentage of venues converted compared to those that did not is greater. This increase in take up later



in the project time frame is related to the Bottlecycler staff acquiring more knowledge of which venue types to target that are likely to continue post trial.

What the Bottlecycler provides is a comprehensive service that provides the bottle crushing machine for use on site, a suitable quantity of bins that allow for weekly collection of the glass, staff briefings and education on how to use machine at the time of installation, machine maintenance and the collection of bins. Currently, it is the only company in Australia that offers this type of technology to facilitate glass recycling as well as the complete package of maintenance and collection service.

Site visits and staff interviews venues were conducted during the project, below are some quotes from staff and management from venues who have converted to using the Bottlecycler long term.

- Madame Brussels *“We had lots of previous problems handling bottles, Love using the machine”*
- Precinct Bar *“ Less space is taken up by the machine, it is convenient for staff, less handling and more efficient for staff as well”*
- Local Taphouse *“The machine is great in terms of space. It churns through the glass, its great!”*
- The Australian Club *“Fantastic! Brilliant! We identified an issue with managing glass as we only had limited space. The trial allowed us to look at the practicality side instead of just the financial side of using the machine. Saves staff time, no issues with servicing, easy to operate”*

## **ISSUES**

The main issues faced by businesses in using the Bottlecycler are the upfront rental costs of three to four hundred dollars per month. This is perceived as a barrier to many businesses when considering the use of the machine as they only take into account the cost, not realising the other savings and benefits that can be obtained when using the machine.

Size of venue is not an issue, it is the turn over of the venue that is critical to whether or not the Bottlecycler can be beneficial to their business. It was identified as part of the project evaluation that venues that only generate small quantities of glass do not benefit from the use of the Bottlecycler. This knowledge has since been beneficial when assessing venues that would be suitable to participate in the trials.

# COST/BENEFIT ANALYSIS

The table below outlines typical scenarios within the hospitality sector with estimated time or costs savings for each

<b>Current Situation (example)</b>	<b>Time/Cost</b>
Put bottles in blue crates (avg 20 bottles)	5 mins
Bring blue crates to loading dock (6 on a trolley)	8 mins
Hand sort by colour	10 mins
Walk back	5 mins
Total cost in time per 6 bar bins	28 mins
20-50 crates per day: average 35 = 700 bottles	1143 minutes
Hours per week	19.1 hours
<b>Bottlecycler</b>	<b>Time/Cost</b>
Put bottles in Bottlecycler (avg 300 bottles per bin)	15 mins
Bring bin to loading dock	5 mins
Walk back	5 mins
Total cost in time per Bottle Cycler Bin	25 mins
700 bottles per week = 2.5 times	62.5 minutes
Hours per week	1.0 hours
<b>Total savings in hours per week</b>	<b>18.0 hours</b>
<b>At \$ 50 per hour ( total company cost )</b>	<b>\$901</b>
<b>Glass Collection cost per week @ \$5.00 per bin * 3 bins \$ 15</b>	
<b>Difference \$ per week</b>	<b>\$ 886</b>
<b>Potential Savings \$ per year</b>	<b>\$46,056</b>

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Staff time saved on waste management allows them more time behind the bar to serve customers. For business this means more profit behind the bar, providing an indirect economic benefit from having the Bottlecyclor in situ. Not all venues will experience the level of time saving set out in the table above, however if having the Bottlecyclor in situ allows enough time for each staff member to serve one extra drink per hour, it provides an opportunity to increase the business profit margin.

**Additional advantages:**

- Space saving: no more crates or small bins stacked behind the bar
- OH&S issues: safer transport of bottles, no manual sorting involved
- Space saving and tidier workplace in the loading dock
- Noise reduction in loading dock

**RECOMMENDATIONS**

The offer of sponsored trial periods for the use of the Bottlecyclor machine has proved beneficial in directly increasing the quantity of glass that has been recovered for recycling by 1,187 tonnes within an eighteen month period with an expected additional 1,000 tonnes to be recovered over the next twelve months from venues that have participated in this project.

The PSF acknowledge that sponsored trials cannot continue indefinitely. However, to avert the current level of cynicism that still exists in the industry towards the bottle crushing technology it is recommended that to facilitate a continued and evident increase in the recovery of glass from the hospitality sector, sponsored or trial periods for the use of the Bottlecyclor, or similar technology if it becomes available to the market, be continued to facilitate knowledge and familiarity with the machine and its benefits to the hospitality sector and the environment. Trials would be of particular benefit in regional areas or other states where the Bottlecyclor or similar technology has had limited or no exposure.

It is also recommended that reports, case studies and other promotional information be published in industry publications and displayed at expos as another means of raising awareness of the benefits of in situ bottle crushing technology such as the Bottlecyclor.

## **CONCLUSION**

The Bottlecycler is currently the onsite bottle crushing technology available on the Australian market that offers a holistic service of machine installation, servicing and collection. Until other companies are available to provide a similar service that produces the same environmental benefits, it is recommended as an efficient way to recover clean quantities of glass from the hospitality industry for recycling.

**APPENDIX 3**

**Hospitality Resource Recovery  
Project**

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Evaluation Report

November 2007

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**National Packaging Covenant  
Hospitality Resource Recovery Project**  
in conjunction with  
**Packaging Stewardship Forum, Victoria**

**Professor John Cary**  
**Institute for Sustainability and Innovation**  
**Victoria University**

November 2007

**INSTITUTE FOR  
SUSTAINABILITY  
AND INNOVATION**



**VICTORIA  
UNIVERSITY**

**A NEW  
SCHOOL OF  
THOUGHT**

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## **EXECUTIVE SUMMARY**

The National Packaging Covenant (NPC) Hospitality Resource Recovery Trial project involved two month rolling trials of on-premises bottle crushing systems at hospitality venues in Melbourne. The bottle crushing systems were installed between May and October 2007. This evaluation reports on the effectiveness of the project. The evaluation included a detailed assessment of ten venues participating in the pilot project. Five of these venues previously disposed of bottles and glass waste to general waste and five venues previously used mixed recycling.

The evaluation of NPC Hospitality Resource Recovery Trial provides clear evidence that the project has been effective in boosting glass recovery in the hospitality sector. Significant additional volumes of waste glass were diverted to high efficiency recycling. The total volume of waste glass recycled through the Bottlecycler pilot program during the trial period and from subsequently continuing venues was 62 tonnes.

Venue staff participating in the pilot trial have been motivated to adopt a recycling culture. It is reasonable to assume that there will be an ongoing and more widespread recognition and diffusion of the value of on-premises bottle crushing within the hospitality industry.

The business case analyses indicate that for venues with large volumes of bottle glass, on-premises crushing is more cost effective than disposal to conventional mixed recycling.

From the assessment of participants in the Hospitality Resource Recovery Project it was clear that the non-cash benefits of on-premises bottle crushing usually add significant benefits or advantage which, for many smaller venues, outweigh any cost difference between use of conventional mixed recycling disposal and on-premises bottle crushing.

## BACKGROUND

The efficiency of glass recycling is currently very poor in Australia with as little as ten per cent of new glass being made from recycled glass in the hospitality industry, in spite of efforts made by venues to separate and recycle glass bottles. The poor rate of recycling is partly due to contamination of glass waste.

The environmental benefits of using cullet (crushed glass produced by a Bottle Crusher) instead of raw materials:

- reduced demand on natural resources – each tonne of recycled crushed glass saves 1.1 tonnes of raw materials,
- reduced emissions – recycling glass saves 64% of the energy used to make new glass,
- less glass waste to landfill.

The Packaging Stewardship Forum (PSF) of the Australian Food and Council was established in May 2006 to represent the interests of its members in increasing the recovery and recycling of packaging materials and reducing packaging litter.

The PSF sought funding through the National Packaging Covenant (NPC), Australia's key instrument for managing packaging waste, for a project working with the hospitality sector to increase the recovery of glass packaging for recycling. The PSF undertook to manage the project on behalf of the National Packaging Covenant and Victorian Government and engaged Professor John Cary of the Institute for Sustainability and Innovation to assess the performance of the pilot project and the use of the Bottlecyclor glass crushing equipment at each of 10 sites which each participated in a trial over a 2 month period.

The project was a partnership between the Packaging Stewardship Forum of the Australian Food & Grocery Council<sup>2</sup>, Bottlecyclor, Fosters, Lion Nathan, Melbourne City Council and the Australian Hotels Association.

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<sup>2</sup> The Packaging Stewardship Forum's members include Fosters, Lion Nathan, Coca-Cola Amatil, Cadbury Schweppes, Bundaberg Brewed Drinks, Gold Circle, Visy, Owen-Illinois and Amcor.

## INTRODUCTION

The aim of the project was to develop best practice recycling and resource recovery in the hospitality sector through both improved practices and education.

The objectives of the project were to:-

- boost glass recovery in the hospitality sector
- educate and motivate staff to adopt a recycling culture
- demonstrate the business case to the hotel/hospitality industry on the benefits of using a Bottlecycler machine, and recovering glass (and potentially other resources) as an integral part of their business.

While the principal aim of the Hospitality Resource Recovery Project was to significantly improve resource recovery in the hospitality sector, it also had ancillary aims, through the use of Bottlecycler machines, to educate hoteliers and staff about:

- improvements to their work practices,
- improved occupational health and safety standards with handling of glass
- reduction of noise when handling glass

## THE NATURE OF THE PILOT PROJECT

The pilot study targeted large to medium hospitality venues without effective glass waste recycling services. These venues typically handled 2-3 tonnes of glass per month (or 24-36 tonnes per annum), with a range from 0.5 tonnes to 10 tonnes of glass per month.

The project involved two month rolling trials of on-premises bottle crushing systems at ten venues. The bottle crushing systems were installed between May and October 2007. In each pilot location venue staff were briefed on:

- safe handling of the glass, and the benefits in not picking up and carrying boxes of bottles
- the importance of excluding any ceramic from the glass to be recycled (One thumbnail of ceramic can contaminate a tonne of glass.)
- the benefits to the environment of recycling glass in saving resources
- that recyclers prefer this glass as it is pure.

Posters were placed near the installed Bottle Crusher machines providing instruction on the proper use of the machine.

Each venue received the use of a Bottlecyclor glass crushing machine for no leasing cost, and free collection of crushed glass, for two months. The support included training staff in the use of the machine.

### ***Bottlecyclor***

The Bottlecyclor is a glass management system / company which utilises a proprietary compact Bottle Crusher to crush glass bottles on site and deliver the compacted crushed glass into a 60L Bottlecyclor bin which holds the equivalent of two 240L conventional recycling bins. The Bottlecyclor Bottle Crusher machine can be located inside, or adjacent to a bar area, and reduces the volume of glass waste to be removed by crushing the glass into recyclable pieces. The average content of ten bar bins fits into one compact, Bottlecyclor wheelie bin. Once the bin is full it is wheeled to the loading bay for pick up by the Bottlecyclor collector. Bottlecyclor collects the filled bins for delivery to Visy Glass Recycling.



Bottle Crusher



60 litre Bottlecyclor bin

Bottlecyclor claims to deliver over 80 per cent of waste glass collected to the manufacture of new glass, about 10 per cent to alternative applications leaving less than 10 per cent going to landfill.

## **THE EVALUATION APPROACH**

In the period to October 2007 glass crushing Bottle Crusher machines were trialled for two months at 16 hospitality venues in Victoria. Additional venues were scheduled for participation in the pilot trial after October 2007. The evaluation in this report focuses on ten venues selected from the 14 venues who had participated in the trial at the time the evaluation was commissioned. The evaluation

involved an interview with a representative of venue management (and sometimes staff members) at each of the ten hospitality venues at the completion of the two month trial. The interview covered a consideration of:

- waste management costs
- labour costs
- occupational health and safety benefits
- noise; and
- awareness of glass recycling issues

The schedule of topics and questions covered in the interviews is presented in Appendix 3.

## ASSESSMENT AT PILOT PROJECT VENUES

Ten venues participating in the pilot project were assessed in this evaluation (Table 1). Five venues disposed of bottles and glass waste to general waste and five venues used mixed recycling.

**Table 1: Pilot project venues assessed in Bottlecycler evaluation study**

Venue	Start date	Trial completion date	Previous method of glass disposal	Bottle-Cycler bins per week	Tonnes per month
Windsor Hotel	12-05-07	12-07-07	Mixed recycling	7.3	1.7
Heavens Door	23-05-07	23-07-07	General waste	2.4	0.6
One Six One	23-05-07	23-07-07	General waste	4.3	1.0
Hilton Hotel (2 units)	01-06-07	1-08-07	Mixed recycling	7.0	1.7
Fix Bar	25-06-07	25-08-07	General waste	2.3	0.5
Night Cat	12-07-07	12-09-07	General waste & mixed recycling	12	2.9
Aqua el Vino	18-07-07	18-09-07	Mixed recycling	3	1.0
Qantas Lounge (2 units)	30-07-07	30-09-07	General waste	34	8.1
Mercure Hotel	22-08-07	22-10-07	Mixed recycling	2	0.5
Collins Quarter	22-08-07	22-10-07	General waste	4	1.0

The volume of recycled glass from weekly Bottlecycler bin collections for each of the ten pilot venues studied in this evaluation are presented in Appendix 1.

## ***Windsor Hotel***

The Windsor is the oldest hotel in Melbourne. The hotel's current loading bay is antiquated, requiring carrying of full boxes of glass bottles down steps, round corners and along corridors. The hotel's owners are planning to renovate the kitchen and loading bay areas. During the pilot trial the machine was located between the kitchen and the loading bay.

The Windsor did not continue to use the Bottlecyclor after the pilot trial. The Purchasing Manager indicated it was "quite possible" that, following renovations, leasing or purchase of a Bottlecyclor could be considered. Cost was the major "stumbling block" to a current decision to continue use of the Bottlecyclor with the estimated leasing cost being nearly double the current cost of bottle disposal (mixed recycling).

During the pilot trail Windsor management was of the view:

*"We will continue to use this machine even if the costs turn out to be more than the way we were handling glass before. Our General Manager supports the push for the environment, and it simplifies our glass handling. It has helped us be serious about recycling, by making it easier."*

However, subsequently it has been difficult to convince management, prior to hotel renovations, of the case for leasing or rental on a solely cost analysis basis.

## ***Heavens Door***

Heavens Door is a ground floor bar operating in Prahran. Bottles were previously disposed to general waste. Following the pilot trial Heavens Door has continued with a Bottlecyclor rental agreement with a contract for two years.

Management at Heavens Door considered that Bottlecyclor was more expensive than their existing glass waste disposal arrangement. However, looking forward, Bottlecyclor was seen as likely to cover costs as the business continued to expand, especially with the expansion of trade over the summer period. The current use of 8 Bottlecyclor bins was expected to increase to 16 bins. In the face of such expansion, the space saving aspect of the Bottlecyclor system was a critical determinant in the decision to use Bottlecyclor.

## ***One Six One***

One Six One is an upstairs bar in Prahran operating three nights a week. One Six One has continued to use Bottlecyclor since July 2007. This venue uses between three and six Bottlecyclor bins a

week (up to 12 x 240 litre bins of glass) depending on volume of trade. Space behind the bar is very limited, with the Bottlecycler providing extra space otherwise taken by two 240 litre bins.

Apart from space saving benefits, a critical element in the decision to continue using Bottlecycler was overcoming the logistical problem of having to use the entry stairs – also used by patrons – to remove waste glass bins during evening trading hours. Venue management was very satisfied with Bottlecycler and considered they were improving environmental outcomes, as well as being a safer way to handle glass and to carry the glass down stairs.

### **Hilton Hotel**

The Hilton Hotel has used mixed recycling for its glass waste disposal. The pilot trial was conducted during the period of the Bledisloe Cup which provided large trading volumes. During the pilot trial the Hilton had two Bottlecycler machines – one in the banqueting area and one for the restaurant and room service. One machine was installed in the kitchen area. It was not possible to fit a machine behind the bar in the Lounge. During the pilot recyclables, waste and Bottlecycler bins were separately held at the back of hotel loading bay for collection.

The Food and Beverage Services Manager considered the Bottlecycler “*worked exceptionally well as a piece of equipment*”. There was a considerable saving of space in the loading bay (approximately two car spaces). While the environmental benefits of the Bottlecycler were recognised, the Hilton has not continued to use the Bottlecycler machine after the pilot trial because of the difficulty of justifying the economic cost when compared to the cost of the existing glass waste disposal.

During the pilot trial it was observed:

*“We are fastidious about our recycling. Bottlecycler fits neatly into the kitchen, and the staff use it easily. The staff have built the Bottlecycler into their work – we now have separate bins for waste, for co-mingled recycling, and the Bottlecycler bins, each in their own area at back of house.”*

### **Fix Bar**

Fix is a lounge bar located in the Waterfront City Precinct of Docklands, with views to the city skyline. Fix has continued to use Bottlecycler after the trial period. Fix was a venue with a smaller throughput of bottle waste. However, in summer months bottle volumes increase considerably.

Fix was the only venue to nominate that its continued use of the Bottlecycler was because it was good for the environment. Fix management was concerned about the amount of bottles and glass wasted, and not recycled, in the night club business. Their view of the Bottlecycler was “*We love it*”.

While cost was not a significant issue for Fix Bar this venue was paying a waste disposal fee as part of its rental to the Docklands building management. Fix intended to negotiate a fee refund because of the major reduction in its general waste. This is obviously an issue of relevance in venues situated in larger centres where there are shared waste disposal arrangements for which a general charge is levied.

### **Night Cat**

The Night Cat is a large venue dedicated to live music and dancing which has been established for over thirteen years. For several nights each week it caters for large crowds of patrons. Night Cat has large volumes of bottle glass which previously was disposed to general waste. Night cat continued to use the Bottlecycler after the trial period. Bottle waste volumes have increased from 12 (55kg) bins during the trial period to 15 bins per week.

For Night Cat, with its large and increasing volumes of bottle waste, Bottlecycler provided a solution to two problems – reducing the large amount of loading bay space required for conventional waste recycling bins, and improving convenience and efficiency for staff: “*When we are flat out on busy nights it is a lot easier wheeling three Bottlecycler bins than ten large bins*”. For Night Cat the main reasons for continuing to use Bottlecycler were economic and space saving: “*It just happens it was good for the environment; and that’s a bonus*”.

### **Aqua el Vino**

Aqua el Vino is a casual, sophisticated bar in Yarraville serving cocktails, spirits, wine, boutique bottled beers, and sometimes offering live music. Aqua el Vino uses mixed recycling for its packaging and glass waste. Aqua el Vino had relatively small volume of glass waste and did not continue with Bottlecycler after the trial period.

Elements in the decision not to continue with Bottlecycler were expense, convenience and time. However the decision was essentially due to the logistics of being an upstairs venue. With the current layout there was no convenient site for the Bottlecycler. It was regarded as slower and more difficult to move the Bottlecycler bins down the external stairs. Usually five or six bar bins were filled with



bottle waste per night and these were emptied into ground floor mixed recycle bins during the day.

The Aqua el Vino view was: *“Originally we thought it would be more convenient. It is slower to put the bottles into the Bottlecyclor than to empty the existing (bar) bins. If we were a downstairs venue, with a room behind the bar, Bottlecyclor would have been perfect.”*

### **Qantas Lounge**

The Qantas Lounge at Melbourne Airport handles a very large amount of recycled, glass waste. Before installing Bottlecyclor, all glass bottles went to the general waste. The Qantas Lounge has a large trade of bottled beer and does not currently serve non-bottled draught beers.

For the Qantas Lounge, with a very large disposal of empty bottles (8 tonnes per month), lower waste disposal costs with Bottlecyclor and company sustainability and recycling objectives, were the reasons for continuing use of the Bottlecyclor system. The Bottlecyclor was originally located in the bar serving area and was a talking point with Lounge guests. Noise was perceived as a concern in the front of house bar location and the Bottlecyclor was moved behind a screen.

### ***Mecure Hotel***

The Mecure Hotel in the Melbourne CBD has a relatively small disposal of glass waste from its restaurant and small bar area which is mostly disposed via mixed recycling. During the pilot trial two bins of glass per week were recycled. It was not considered feasible to include bottle waste from housekeeping and room service in the Bottlecycler trial. In the future, recycle bins and co-mingled bins are planned to be installed in all hotel rooms.

Mecure has not converted to an on-going Bottlecycler lease, although its manager responsible for maintenance was unsure what a future decision might be. The current decision not to continue with Bottlecycler was determined by relative cost - \$300 per month for the Bottlecycler lease and bin collection was greater than the estimated cost of \$120 per month for commercial mixed recycling bin collection.

### ***Collins Quarter***

Collins Quarter is a courtyard tavern bar at the upper end of Collins Street. The owner of this bar had previously trialled Bottlecycler at another nearby city bar (Madam Brussels) which was co-owned and which has continued use of the Bottlecycler. Collins Quarter also intended to continue use of the Bottlecycler.

While the Bottlecycler required more staff time than disposing bottles to undifferentiated waste, the attraction of Bottlecycler for Collins Quarter was space saving in a small CBD bar and the need to eliminate rubbish bins from the rear access laneway. Advantages for the environment were also considered significant.

### ***Summary***

Six of the ten pilot project venues converted to on-going Bottlecycler service after completion of the trial period.

Three of the four venues not continuing with the Bottlecycler system cited the relative cost, compared to existing disposal method (most commonly mixed recycling), as the reason for non adoption. All of the venues citing cost as the barrier to adoption were large hotels where – commonly – beverage and hospitality management had to be able to make a case to convince hotel management or owners on the basis of relative cost regardless of other attributes of the Bottlecycler or other advantages in terms of work practice. For the one other non-adopting venue (Aqua el Vino), space and the logistics of an upstairs venue mitigated against continuing with the Bottlecycler.

For four of the six venues continuing with the Bottlecycler system the principle reason for adoption of the system was related to space savings, the logistics of moving bottle bins and increased workability for staff, particularly during busy periods. One adopter cited Bottlecycler glass recycling being good for the environment as the principal reason for adoption. For the Qantas Lounge, with a very large disposal of empty bottles (8 tonnes per month), lower waste disposal costs with Bottlecycler and company sustainability and recycling objectives, were the reasons for continuing use of the Bottlecycler system.

**Table 2: Venues converting to on-going Bottlecycler service after pilot project**

Venue	Previous glass disposal	Continued use / Planned to continue beyond trial	Principal reasons for continuing	Principal reason for not continuing
Windsor Hotel	Mixed recycling	No / Possibly after refurbish		Cost
Heavens Door	General waste	Yes	Space (in busy periods)	
One Six One	General waste	Yes	Within venue logistics	
Hilton Hotel (2 units)	Mixed recycling	No / Unsure		Cost
Fix Bar	General waste	Yes	Good for environment	
Night Cat	General waste & mixed recycling	Yes	Space. Staff efficiency Lower cost	
Aqua el Vino	Mixed recycling	No		Within venue logistics
Qantas Lounge (2 units)	General waste	Yes (1 unit)	Lower waste cost / Corporate policy	
Mecure Hotel	Mixed recycling	No (at this stage)		Cost
Collins Quarter	General waste	Yes	Space	

All of the four venues not continuing post-trial with the Bottlecycler disposed of bottles and glass waste to mixed recycling. Five of the six continuing venues had previously disposed bottles to general waste.

## CONSIDERATION OF CRITICAL ISSUES

### *Waste management costs*

The comparative cost of leasing the Bottlecycler machine, compared to cost of disposal via mixed recycling, was an obstacle for the three large hotel venues. The hospitality management staff in these hotel were otherwise strongly aware of the advantages of the Bottlecycler system. However, because of the separation of hospitality management, senior management and ownership of these large hotels hospitality managers reported difficulty in convincing hotel management or owners on the basis of relative cost regardless of other attributes of the Bottlecycler or other advantages in terms of work practice.

The purchasing manager for The Windsor provides a typical reaction of the hotel venues: *“At the end of the day I can see huge advantages for the Bottlecycler. Cost is the main obstacle – we may come to grips with this.”*

**Table 3: Influence of comparative waste management cost on decision to lease Bottlecycler**

Venue	Cost disadvantage for Bottlecycler	Cost of Bottlecycler comparable with other waste disposal	Cost advantage for Bottlecycler	Other advantages more significant than cost
Windsor Hotel	✘			
Heavens Door				√
One Six One				√
Hilton Hotel (2 units)	✘			
Fix Bar				√
Night Cat		√		
Aqua el Vino				√
Qantas Lounge (2 units)			√	
Mercure Hotel	✘			
Collins Quarter				√

For most other venues comparative cost, while a significant consideration, was not a barrier to choosing to use Bottlecycler (Table 3). For venues with large waste volumes there appeared to be some cost advantage for Bottlecycler, possible because of the tiered leasing cost structure.

For at least one CBD bar the cost of bottle disposal to general waste was included in Melbourne City Council rates. Therefore the comparative cost of Bottlecycler would always be higher, with other factors being the determinant of the choice to use the Bottlecycler.

### Labour costs

For many venues labour saving, and any associated cost savings, with the use of the Bottlecycler machines, while identified, were difficult to impute. There was variation which depended on bottle disposal practice and particular venue logistics. For one venue (The Hilton), with large staff numbers, it was possible to impute real labour cost savings over a year. For some venues the Bottlecycler freed up bus staff and sometimes bar staff to attend more efficiently to other duties, but with no reduction of staff numbers. The Hilton estimated time savings valued at \$1000 - \$2000 per year.

For some venues the process of placing empty bottles in the Bottlecycler was more demanding of time than previous practices of throwing bottles into a bar bin, particularly during peak serving times.

Table 4: Potential labour savings with use of Bottlecycler

Venue	Labour savings or increased efficiency; freed staff time	No obvious saving	Convenience (inconvenient)	More time consuming
Windsor Hotel		√		
Heavens Door	√			
One Six One	√			
Hilton Hotel (2 units)	√			
Fix Bar		√		×
Night Cat			√	
Aqua el Vino			(×)	×
Qantas Lounge (2 units)	Minor			
Mercure Hotel	√			
Collins Quarter				×

## Occupational health and safety

Generally, OH&S problems were seen to be reduced with the use of Bottlecyclers. However, most venues did not see occupation health and safety issues with Bottlecyclers as being markedly different than previous or alternative methods of glass disposal. The few issues of difference, or improvement, with Bottlecyclers are noted in Table 5.

**Table 5: OH&S improvements or other OH&S issues associated with use of Bottlecyclers**

Venue		OH&S advantages or negative issue	Nature of negative issues
Windsor Hotel	✘	Weight of Bottlecyclers bin	Because of design of The Windsor, could be an OH&S issue.
Heavens Door	✓	Eliminates double handling	
One Six One	✓	Reduces likelihood of broken glass injuries	
Hilton Hotel (2 units)	✓	Smaller bin to move around	
Fix Bar	✘	Increases likelihood of broken glass injuries	While separating bottles from other rubbish in bar bins prior to placing bottles in Bottlecyclers.
Night Cat	✓	Less broken glass with Bottlecyclers	
Aqua el Vino	✘		Specific location problem – extra risk in moving heavy Bottlecyclers bin down external stairs
Qantas Lounge (2 units)	✓	Potential lifting injuries (with bar bins) reduced	
Mercure Hotel	✓	Two people required to carry bar bins and tip into large recycle bins	
Collins Quarter		- Not an issue -	

## Noise benefits

For most venues noise was not considered a problem, without or with a Bottlecyclers installed.

Generally minor noise issues with bottle disposal were raised by four venues. For some bars ‘pumping’ music is much more a noise issue.

For the Hotel Windsor the Bottlecyclers reduced noise associated with loading large recycle bins in the loading bay/access lane, which inconvenienced some guests in rooms located above the loading bay.

One Six One: Noise was a problem with bottles being loaded into big bins in external access lane. Lower noise associated with Bottlecyclers was an advantage when seeking a permit application with VCAT.

For the Hilton noise was a potential problem because of location in a residential neighbourhood.

The Qantas Lounge: When the Bottlecycler was located in the front of house bar area its noise was considered a problem. To overcome this problem the Bottlecycler was moved behind a screen.

### ***Freeing up space***

For most venues there was a space saving with the compacted waste and smaller bins used with a Bottlecycler (Table 6). For some venues, particularly bars with limited space and limited loading facilities, space saving was a significant factor.

**Table 6: Space freed up with use of Bottlecycler**

Venue	Is there a space saving?	Nature or importance of space savings
Windsor Hotel	YES	Space not a critical issue – may become so with redevelopment
Heavens Door	YES	Reduces waste storage area by one third.
One Six One	YES	9-10 bins reduced to 4 bins with Bottlecycler
Hilton Hotel (2 units)	YES	Reduces loading bay requirement by 15-20 sq metres (approximately 2 car spaces)
Fix Bar	YES	Eliminates need to temporarily encroach on fire exit walkway with storage bins
Night Cat	YES	
Aqua el Vino	Not an issue	
Qantas Lounge (2 units)	Not an issue	12-14 big bins reduced to 6+ smaller bins per night.
Mercure Hotel	NO	Small number of bins
Collins Quarter	Not an issue	

### ***Awareness of glass recycling issues***

Both management and venue staff, as a consequence of the resource recovery project, were aware of the value and importance of glass recycling. In some cases managers or owners were very strong proponents of recycling and the need for more sustainability in the hospitality industry. It was also common for managers and owners to assert that for on-premises bottle crushing to be accepted, economic or other venue management benefits were necessary prerequisites for recycling to be acceptable.

Typical responses were:

*“Staff thought it was a great idea.”*

*“Staff are very conscious of the environment. Our staff tend to be environmentally-friendly people.”*

*“We are into recycling; so this helps.”*

Frequently venue staff expressed the concern of lack of glass recycling in the hospitality industry – with large volumes of glass disposal – in contrast to their domestic circumstance where mixed recycling is now the norm.

Typical responses were:

*“We are concerned about the amount of bottles and glass wasted in the night club business.”*

*“Some staff had been concerned about the volume of non-recycled waste here compared to what they were doing at home.”*

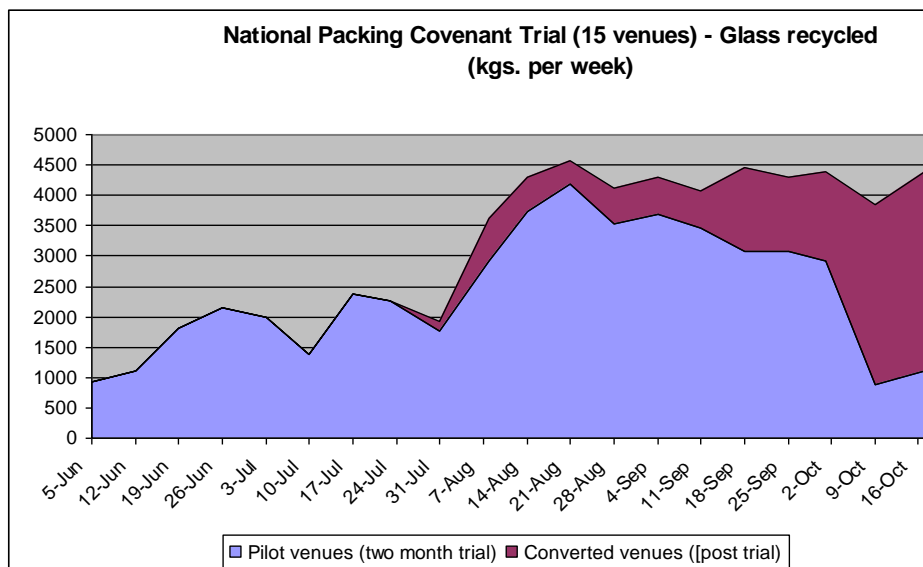
## THE BUSINESS CASE FOR BOTTLECYCLER MACHINES

### Materials diverted as a result of the project

#### Glass recovered for recycling

As at 17 October 2007 4.4 tonnes per week of glass was being recycled as a consequence of the NPC trial. The majority of this volume of recycled glass (3.3 tonnes per week) was now being supplied by venues which had converted to a Bottlecycler commercial contact after participating in the two month pilot trial (Chart 1). The trial can thus be considered successful in adoption of separated glass recycling.

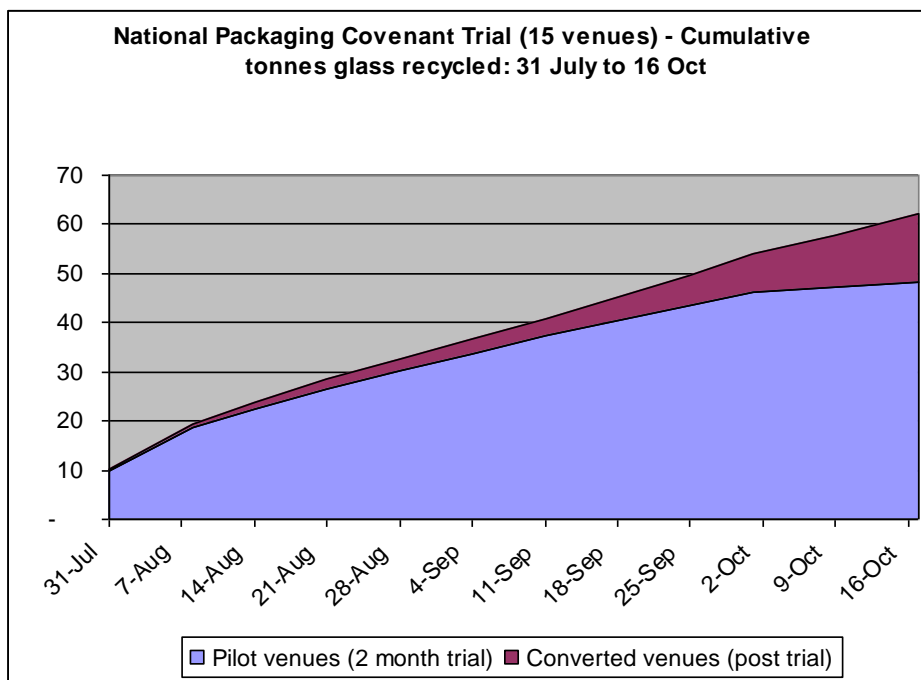
CHART 1





The total volume of waste glass recycled through the Bottlecyclers pilot program (two month trial period plus volumes from subsequently continuing venues) was 62 tonnes (Chart 2). The pilot program within the venue trial period produced 48 tonnes of glass available for recycling.

**CHART 2**



**The market for the materials recovered/recycled as a result of the infrastructure funding.**

The crushed glass from the NPC Hospitality Resource Recovery Trial has been delivered to Visy Recycling for automatic sorting and recycling. The glass has little or no contamination. Bottlecyclers has adapted the output from its bottle crushers to meet Visy requirements and guarantees a recovery rate of bottle glass for recycling that is well above industry average.

The Bottlecyclers crushed glass particles (called cullet) are used to make glass containers, provided the cullet is sorted by colour. Bottlecyclers Glass Management Services uses dedicated trucks which exclusively collect the clean glass cullet, processed by the Bottlecyclers crusher.

## ***Greenhouse gas reduction***

The total volume of waste glass recycled as a consequence of the pilot program was 62 tonnes (to October 2007). Employing an algorithm developed by RMIT, and used by Sustainability Victoria to estimate global warming recycling benefits, the recycling of 62 tonnes of bottle glass, in terms of global warming recycling benefits, will reduce carbon emissions by 37 tonnes of CO<sub>2</sub>.

## ***The elements of a business case***

The experience of the pilot trial participating venues, considered in Section 5 and Section 6 above, indicates that the relative importance of elements to be considered in a business case for the use of Bottlecycler will be different for different hospitality venues.

The volume reduction associated with on-premises bottle crushing should lead to lower bottle waste collection costs. However, often this was not the case given that the alternative disposal methods were to mixed recycling (also with much lower yields of effective glass recycling), or to general waste (to landfill and with no glass recycling). Often costs of conventional waste disposal were incorporated in council rates or existing site rental costs where venues were part of larger hospitality centres. The consideration of a business case by individual venues will, unfortunately, ignore these 'externality' costs.

The volume reduction associated with on-premises bottle crushing was found in most cases to lead to less handling and potential time savings. Half of the venues identified labour savings, increased efficiencies or freeing-up of staff time.

Bottlecycler Pty Ltd claims that up to 50% of the monthly fee for the crusher and service is usually recouped by the reduction in collection cost or by saving 15 minutes daily on labour costs. On the basis of the evaluation study, this is probably a reasonable estimate, other than for the situations where existing waste disposal charges are 'free' at the margin (e.g. built into Council rate charges). In such situations hospitality venues need to be committed to recycling their glass waste, or (as was commonly found in this evaluation) to identify other work efficiency benefits or, for higher volume venues, glass recycling needs to be mandatory.

There are other potential savings, for most venues, in storage space, reductions in OH&S risks, and fewer noise problems.

## ***The externality elements***

An externality is an impact (positive or negative) on any party not involved in a given economic transaction. Negative externalities are costs that are not borne by those parties in an economic transaction.

One of the externality costs for conventional glass waste disposal for some venues is where waste disposal cost (sometimes irrespective of waste volumes) is not a directly levied cost to the venue but is provided as a service included in council rate charges or a site rental.

On-premises bottle crushing will reduce volumes and frequency of glass waste collection with higher value per payload and lower pick up frequency, resulting in positive externalities of lower transport costs, reduced fuel use, as well as less contamination of the cullet.

Other positive externalities resulting from on-premises bottler crushing are the higher recovery rate of recycled glass (because of the improved quality of the recyclable glass cullet) and the consequent reduction in CO2 discharge in the atmosphere.

### **Example business case studies**

These case studies consider a large hotel and a club/lounge with larger volumes of glass waste. These individual venue business cases do not consider externalities.

### **Case Study 1: Large and smaller hotel (based on the Hilton Hotel and the Mecure)**

<b>Cost element (\$ per month) *</b>	<b>Hilton Hotel</b>	<b>Mecure</b>
	<b>(2 units)</b>	
Rent / lease of Bottlecycler	690	300
Alternative glass waste removal	615	120
Difference in waste disposal / collection cost	(75)	(180)
Labour cost savings (estimate)	160	**
Space saving – bin storage ***	760	
Power cost	(20)	
<b>Net gain (cost) per month</b>	<b>825</b>	<b>(180)</b>

\* NOTE: Non cash benefits usually add significant benefits or advantage (see earlier discussion).

\*\* While Mecure identified savings in staff time, it was not considered of a significant scale to produce a reduction in cash labour cost.

\*\*\* Space saving estimated on two car spaces. Space valued at \$380 per car space per month. (Source: ARRB Transport Research) Note this is a cash estimate the real value of which will depend on the site opportunity cost.

## **Case Study 2: Large bar or club lounge (based on the Night Cat and the Qantas Lounge)**

<b>Cost element (\$ per month) *</b>	<b>Qantas Lounge</b>	<b>Night Cat</b>
Rent / lease of Bottlecycler	670	370
Alternative glass waste removal	820	430
Difference in waste disposal / collection cost	150	60
Labour cost savings (estimate)	100	**
Space saving – bin storage ***		240
Power cost		
<b>Net gain (cost) per month</b>	<b>250</b>	<b>300</b>

\* NOTE: Non cash benefits usually add significant benefits or advantage (see earlier discussion).

\*\* For Night Cat there was increase convenience for staff rather than staff labour savings.

\*\*\* Space saving estimated on demand for and value of parking space at Night cat venue. Note this is a cash estimate the real value of which will depend on the site opportunity cost.

### **Smaller bars and night clubs**

For most of the smaller bar venues implementing the Bottlecycler system, while relative cost will be a significant consideration, the principle reason for implementing the system is likely to be related to space savings in small premises, the logistics of moving bottle bins, and increased workability for staff, particularly during busy periods.

## **CONCLUSIONS**

The evaluation of NPC Hospitality Resource Recovery Trial provides clear evidence that the project has been effective in boosting glass recovery in the hospitality sector. Significant additional volumes of waste glass have been diverted to high efficiency recycling and venue staff participating in the pilot trial have been motivated to adopt a recycling culture. It is reasonable to assume that there will be an ongoing and more widespread recognition and diffusion of the value of on-premises bottle crushing within the hospitality industry.

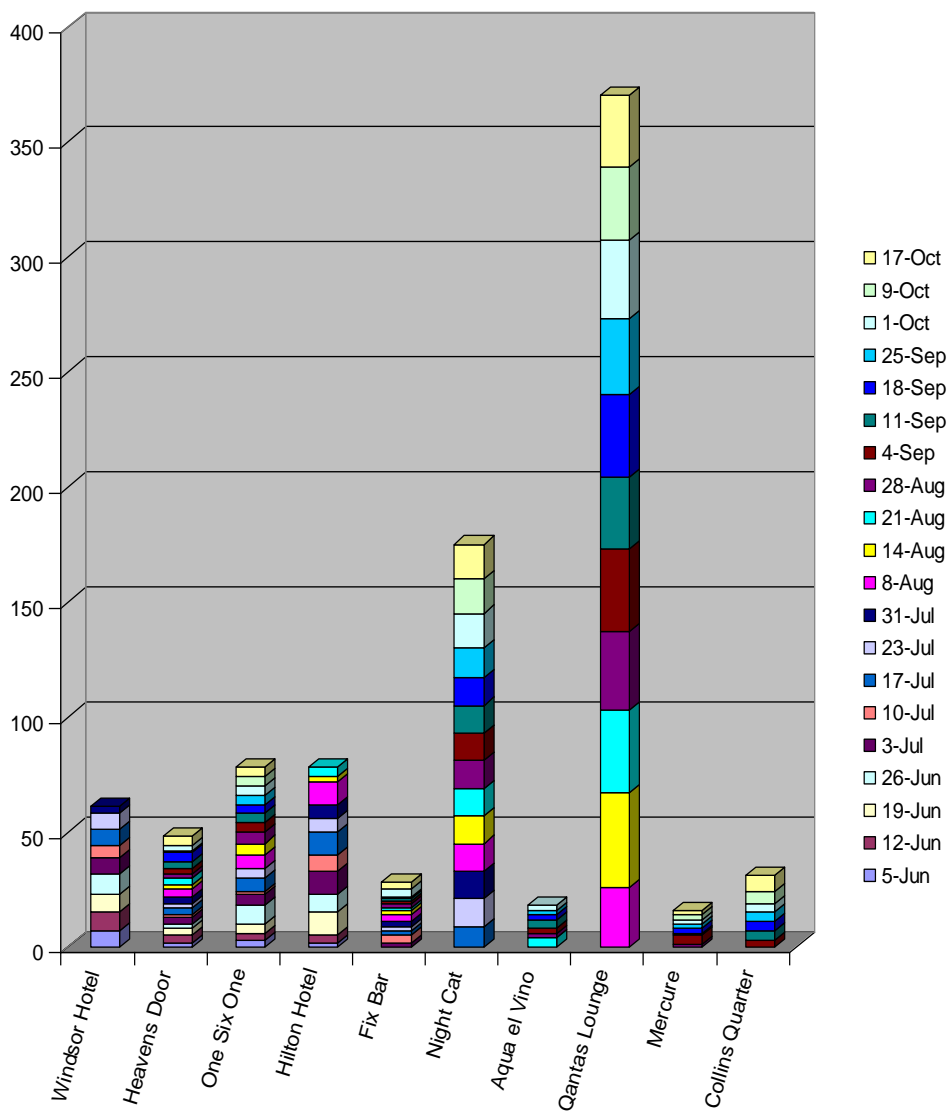
The business case analyses indicate that for venues with large volumes of bottle glass, on-premises crushing is more cost effective than disposal to conventional mixed recycling.

From the assessment of participants in the Hospitality Resource Recovery Project it was clear that the non-cash benefits of on-premises bottle crushing usually add significant benefits or advantage which, for many smaller venues, outweigh any cost difference between use of conventional mixed recycling disposal and on-premises bottle crushing.

## APPENDICES

### APPENDIX 1: Bin collections from ten pilot venues

Weekly collection of BottleCycler bins (55kg) during pilot trial



## APPENDIX 2: Comments from venue management and staff

Brian Frewin, Heavens Door

*It's a win for everybody – the environment wins, I win and the customer wins. It's just so easy.*

*I am so happy with it that when we were remodelling the bar, we did so with Bottlecycler in mind and positioned it at the bar in full view of the patrons. Positioned here it saves double handling and time. It has generated some great responses from patrons who are pleased that we are recycling efficiently.*

*It has also improved the visible environment, removing the wheelie bins which were sometimes tipped over creating noise and mess on the street. It's my new toy and I invite prospective users and licensees to come and see it behind the bar.*

Nino, One Six One

*For us it's perfect. As we are a nightclub, we sell mainly stubbies and being on the first floor there is little space for rubbish. Staff were continually moving the rubbish from the bar to the back of house and then downstairs, about every half hour. With Bottlecycler, we just take 2 bins down per night. This has freed staff up to keep the club clean and concentrate on looking after patrons.*

*It has eased the pressure off everyone. It's quiet, easy to use, we're having less injuries caused by staff being cut by broken glass and we are pleased to be recycling efficiently.*

Peter Kirst, Hilton

*During our 2 month trial of Bottlecycler here at Hilton we have found many benefits which largely contributed into day to day running of our operation. The main factors such as less man handling and subsequently saving on our labour cost, saving of space, less noise pollution and elimination of unpleasant odours. We will be looking forward to having Bottlecycler here at Hilton permanently.*







## APPENDIX 3: Interview Schedule

1. Has / will the business continue(d) to use the Bottlecycler after the trial period?

- yes       no       unsure . . . depends on: \_\_\_\_\_  
 don't know

IF YES:

What are the main reasons why you would continue using the Bottlecycler after the trial period?

IF NO :

What are the main reasons why you would not continue using the Bottlecycler after the trial period?



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### Bottlecycler and waste management costs

	Pre-trial	During trial	Post-trial Implication – business case modelling
<b>Waste management cash costs</b>			
<b>1. Bottlecycler leasing</b>  [Leasing: \$390 p month. Confirm Bottlecycler service agreement includes on-site machine maintenance, warranty, bin maintenance and glass collection.]			
<b>2. Skip and waste removal costs</b>			
<b>3. Other costs</b>			
<b>4. Use of skip</b>  4.1. Number of skips per month / per week			
<b>Labour costs</b>			
<b>1. Time savings</b> 1.1. How much staff time is saved with the Bottlecycler?			
<b>2. Cash costs</b> 2.1. Does this represent any <u>dollar</u> cost saving to the business?			



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	Pre-trial	During trial	Post-trial Implication – business case modelling
<b>3. Labour costs / savings – non-cash</b> 3.1. What are the implications of any freed time for staff activity?			
<b>4. Opportunity costs – other</b> 4.1. Are there any other implications for staff work practices?			
<b>OH&amp;S Aspects / benefits</b>			
<b>1. Lifting</b> 1.1. Did any staff experience any injuries from lifting <u>empty</u> bottles before the installation the Bottlecycler? IF YES: How many? 1.2. Have any staff experienced any injuries from lifting <u>empty</u> bottles since installation of the Bottlecycler? IF YES: <i>How many?</i>			
<b>2. Tipping</b> 2.1. Did any staff experience any injuries from tipping boxes of <u>empty</u> bottles before the installation the Bottlecycler? IF YES: How many? 2.2. Have any staff experienced any injuries from tipping boxes of <u>empty</u> bottles since installation of the Bottlecycler? IF YES: <i>How many?</i>			



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	Pre-trial	During trial	Post-trial Implication – business case modelling
<p><b>3. Broken glass injuries</b></p> <p>3.1. Did any staff experience any injuries from broken glass, associated with <u>empty</u> bottle disposal, before the installation the Bottlecycler? IF YES: <i>How many?</i></p> <p>3.2. Have any staff experienced any injuries from broken glass, associated with <u>empty</u> bottle disposal, since installation of the Bottlecycler? IF YES: <i>How many?</i></p>			
<p><b>4. OH&amp;S other</b></p>			
<p><b>Noise and noise reduction</b></p>			
<p><b>1. Noise level</b></p>			
<p><b>2. Noise level – reported</b></p> <p>2.1. Were there problems with noise associated with the disposal of empty bottles <u>before</u> the installation the Bottlecycler?</p> <p>2.2. Are there problems with noise with the Bottlecycler?</p>			



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	Pre-trial	During trial	Post-trial Implication – business case modelling
<b>3. Noise abatement – other</b>			
<b>Other Cost Savings</b>			
<b>1. Freeing up of car park space</b>			
<b>2. Value of additional car park</b>			
<b>3. Other savings</b>			
<b>Other consequences of Bottlecycler</b>			

### Other Questions

1. Has the installation of the Bottlecycler changed the way the staff think about waste management?



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yes       no       unsure

IF YES:

In what way?

2. Has the installation of the BottleCrusher changed the way management think about waste management?

yes       no       unsure

IF YES:

In what way?

IF APPLICABLE:

3. Has the installation of the Bottlecycler changed how you think about waste management in any way?

4. Do you have any other comments about the outcomes from using the Bottlecycler?