



Sydney2030/Green/Global/Connected



Reverse Vending Machine Trial

Project Evaluation Report

The City of Sydney has taken a proactive approach to dealing with the issue of beverage container litter through its trial of the use of Reverse Vending Machines



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Executive Summary

Beverage container litter is a big issue in NSW. Currently around 160 million beverage containers are discarded as litter across the state each year¹. They are the most significant contributor to litter volume in the state, making up 44 per cent of the volume of all litter.

Aluminium cans and polyethylene terephthalate (PET) plastic bottles are particularly problematic due to their lightweight properties and the prolific consumption of products packaged in these containers (for example water and soft drinks). A recent audit of litter captured in stormwater pits in the inner Sydney region found that the average stormwater pit contained 25 beverage containers of which 94 per cent were PET plastic bottles and aluminium cans².

The City of Sydney has taken a proactive approach to dealing with the issue of beverage container litter through its trial of the use of Reverse Vending Machines (RVMs) in public places to collect beverage containers for recycling. Unlike a traditional vending machine, where customers insert payment for items that are then dispensed, the RVMs used in the trial allow users to insert their empty aluminium cans and PET plastic bottles for recycling in return for rewards.

Broadly, the City's objectives for the RVM trial were to encourage public place

recycling, provide cleaner streets through reduced littering, and raise awareness about container deposit schemes (CDS).

The City launched its RVM trial in June 2014, supported by funding from the NSW Government's Waste Less, Recycle More initiative. In its first year the RVM trial consisted of two machines operating in litter hotspot areas at Circular Quay and Haymarket. These machines gained a lot of attention and had strong usage and community support. The success of the trial in the first 12 months prompted the City to extend it for another year and install a further two machines at Wynyard and Redfern.

Rewards offered in the trial have included instant wins, such as free bus tickets, an option to donate 10-cents to Clean Up Australia or Oz Harvest and entry into large prize draws, for example to win a family pass to the City's New Year's Eve event at Dawes Point.

A comprehensive program of evaluation measures has been undertaken by the City as part of the trial in order to assess the results and outcomes of the project. This has included online and face-to-face user surveys, public place bin audits, litter surveys plus analysis of container count and rewards vended data from the RVM service provider Envirobank.

Achievements of the RVM trial to date include:

Increased recycling in public places

- More than 159,000 beverage containers weighing nearly 2.3 tonnes (739 kg of aluminium cans and 1,522 kg of PET



plastic bottles) were deposited in the RVMs for recycling; and

- Fewer PET plastic bottles and aluminium cans were discarded in public place bins at RVM sites³ compared to bins at similar sites without RVMs.

RVM users rewarded

- More than 52,000 rewards have been vended to RVM users.

Donations to charities

- 28 per cent of RVM users selecting a reward have opted to donate to charity, resulting in almost \$1,500 of donations to Clean Up Australia and Oz Harvest.

Increased awareness of CDS:

- Active and ongoing testing and promotion of the concept of an incentive-based container recycling scheme contributed to increased public awareness; and
- Unprecedented media coverage of the City's display of a giant 10-cent coin artwork installation in front of Customs House at Circular Quay for the project launch put both the project and container deposit schemes in the mainstream spotlight, making it a public discussion point.

Greater understanding of public acceptance of and appetite for CDS:

- 94 per cent of people would support the introduction of a CDS in NSW; and
- Four out five people (80 per cent) would recycle more if a 10-cent cash refund was offered.

Findings of the online and face-to-face surveys indicated that awareness of RVMs was low among CBD residents and

commuters. This is unsurprising given there are so few machines in the City. Positively, the conversion rate from awareness to usage was found to be strong, with a little under half of people that have seen an RVM stating they have used one.

Overall support for RVMs was found to be very strong, with more than 90 per cent of respondents indicating that they would use an RVM if it was conveniently located for them. Lack of awareness and knowledge about RVMs was found to be the main barrier to usage.

In September 2015, a little over one year after the City's RVM trial started, the NSW Government announced plans to implement a state-based container deposit scheme by July 2017. The aim of that scheme is to incentivise the return of beverage containers for recycling in order to reduce the volume of litter in NSW by 40 per cent by 2020.

The state container deposit scheme announcement was welcomed wholeheartedly by the City of Sydney. The City was given the opportunity to contribute

to the NSW Environment Protection Authority (EPA) CDS working groups in the form of representation at meetings. In addition, the City has provided data and information regarding the RVM trial to the EPA working groups throughout the course of the project and this intelligence has been used to inform the development of the state-wide scheme.

In May 2016 details of the model for the NSW CDS were announced. Under the scheme, a network of collection depots and RVMs will be set up across the state to receive eligible empty beverage containers and issue a 10-cent refund per container.

So what's next? The City is committed to leading the way to the CDS by continuing the RVM trial for a third year. However, the scope of the project will be scaled back to two machines in July 2016. The RVMs at Redfern and Circular Quay will remain in place and will operate until the trial concludes, which will be around the same time as the commencement of the NSW CDS.

The City is committed to leading the way to the CDS by continuing the RVM trial for a third year.

¹ NSW EPA – 2014-15 data

² A Prince Consulting, 2015

³ April 2016 public place bin audit results – apply to Haymarket, Wynyard, and Circular Quay locations

What We Did

Project Background

In June 2014 the City of Sydney commenced a trial of the use of Reverse Vending Machines (RVMs) in public places to collect beverage containers for recycling. The trial was initiated by grant funding provided to the City by the NSW Government through its Waste Less, Recycle More initiative, financed from the state waste levy.

The City chose to trial RVMs because this technology has been shown to make public place recycling more accessible, produce a cleaner recyclable commodity than street litter recycling bins and help minimise littering of beverage containers by placing a value on these items.

In its first year the RVM trial consisted of two machines operating in litter hotspot areas at Circular Quay and Haymarket. The City promoted the machines, using a well targeted marketing campaign, which gained a lot of attention. The popularity of the machines in the first 12 months prompted the City to extend the project for a second year and install a further two machines at Wynyard and Redfern.

The popularity of the machines in the first 12 months prompted the City to extend the project.

Aims and Objectives

The aims of the trial were to see if RVMs would be a viable option to help reduce litter in the City's hotspot areas and to provide better recycling options for members of the public while out and about. In addition, the City wanted to test whether there was an appetite within the community for an incentive-based approach to change behaviour around littering and recycling (that is a CDS), and whether rewarding people for doing the right thing would translate into a reduction in littering and increase in recycling.

Specifically, the objectives of the RVM trial were to:

- 1 Determine whether RVMs are an effective way to enable and encourage public place recycling;
- 2 To provide cleaner streets by reducing litter from beverage containers; and
- 3 To raise awareness and promote the benefits of CDS.

Site Selection

The City scoped out a dozen possible sites in known litter hotspot areas for placement of the RVMs. Surprisingly, finding suitable sites to install the machines in the public domain has been the most significant challenge of the project thus far. It took over 100 work hours to lock in the four current RVM sites due to unexpected issues that needed to be resolved at each one. Many of the challenges experienced in siting the machines were due to the highly developed nature of Sydney's streetscapes and the fact that no two sites were exactly the same.

The four sites selected for the RVM trial

- 1 Behind the bus stands on Alfred St in **Circular Quay** operational from June 2014
- 2 Adjacent to Wynyard Park on York Street in **Wynyard** operational from June 2015
- 3 On Dixon St Mall in **Haymarket** (Chinatown) operational from June 2014
- 4 In **Redfern Village** (near the corner of Regent and Redfern Streets) operational from June 2015

To make it viable, each site needed to satisfy the following criteria:

- Access to power;
- Well-lit to minimise vandalism;
- Public area with high litter rates;
- Machine should not obstruct pedestrian or cycle traffic thoroughfares;
- High foot traffic area, or near area where beverages are consumed;
- A level surface, or surface that can be levelled; and
- Ideally have a wall available for the machine to stand against.

Other important factors that needed to be considered and managed at each site were:

- Planning restrictions and requirements;
- Promoting the initiative and gaining support for it from surrounding businesses and building owners; and
- Consultation with managers of train and bus stations (in this case Transport NSW) and street furniture service providers.

Site Partner Acknowledgment

The City would like to thank the following partners for their support to make the locations of these RVMs operationally possible.

Haymarket – Tenakau Investments Pty Ltd and CI Australia

Redfern – Michael Gutierrez and Benson Australia

Circular Quay – Dexus Gateway Retail Centre and JCDecaux



Using Reverse Vending Machines



1 An empty PET bottle or aluminium can is fed into the machine



2 The RVM user is prompted to press the green button to select a reward



3 The user chooses their reward via the interactive LCD screen



4 The RVM issues the user with a coupon, which can be redeemed for their chosen reward

Reverse Vending Machine Trial



The Machines

Working in the opposite way to a vending machine, the RVMs used in the City's trial accept empty aluminium cans and plastic PET bottles, which are fed into the machines by users. In return for depositing a container, the machines offer users a choice of rewards, via an interactive LCD screen, such as going in a draw to win a prize, making a donation to a charity, bus tickets or vouchers for meals from food trucks.

The machines crush and store the beverage containers for later collection. Scanning and sorting technology in the machines rejects unsuitable containers, keeping the recyclable beverage containers free from contamination and out of landfill.

Up to 3,000 containers can be collected in each of the RVMs before they require emptying. The machine automatically communicates its container levels to the service provider, who empties the machine and sends the recyclable containers for processing.

When a machine is not functioning for some reason, error notifications are sent by SMS to a technician, enabling rapid response to fix off-line machines.

All four machines used in the trial were leased through Envirobank Recycling. Having its RVMs installed at outdoor sites for a long-term period was a first for Envirobank. The machines required some custom modifications, including weatherproofing and additional lighting to make them fit for outdoor public place use. Envirobank assisted the City with modifications, which included adding custom-made Perspex rain hoods and lightboxes to each machine and applying City of Sydney-branded machine skin graphic panels with anti-graffiti coating.

Envirobank provided the City with real-time data reporting for all machines through its user-friendly online data portal. Data available 24/7 included:

- Number of containers deposited in each machine by month;
- Rewards vended by each machine by month;
- Energy savings (from containers recycled);
- Vended and redeemed reward values; and
- Site comparisons.

What We Did



Marketing

The launch of the first machines in June 2014 was accompanied by a well-targeted marketing campaign.

Marketing Strategy

As the concept of RVMs had to be introduced and clearly explained to the community, the marketing campaign focused on creating awareness of how the machines worked, where they were located, and what rewards were on offer.

At the time the marketing campaign was instigated there were only two machines and they were in specific, time-limited locations, so the marketing strategy was to keep the communications highly localised.

As the RVM project was a trial, the spread of the marketing activity was conservative but the creative material was designed for maximum impact. The City wanted to engage passers-by and influence their attitudes towards waste: from viewing it as rubbish to viewing it as a valuable resource.

Using the machines is a novel experience. With that in mind, the marketing concept was based around making the experience of recycling fun, entertaining and rewarding.

The campaign also leveraged the opportunity to make a statement about the merits of a CDS and the City's support for the introduction of such a scheme.

Marketing Objectives

The objectives of the marketing campaign were to:

- Create awareness about the RVMs;
- Engage passers-by;
- Promote a way to recycle in public places; and
- Facilitate a call to action in support of CDS.

Campaign Audience

There were three core target audiences for the marketing campaign:

- 1 Workers and the lunchtime crowd in the City – customers near shopping areas and restaurants, cafes and takeaway food outlets (that is litter hotspots).
- 2 Other visitors to the City, such as tourists.
- 3 Residents.

A secondary target audience was opinion formers, including non-government organisations advocating for a CDS.

Marketing Activity

The City of Sydney employed the following mediums to promote the RVM trial:

Outdoor advertising

- Lenticular design panel on the front of the RVM skin (that is the image on the panel changed depending on the angle you viewed it from); and
- 20 JCDecaux Citylights posters.

Digital screens

- Two weeks' worth of lift and lobby screen advertising in 25 office towers near Alfred Street; and
- Advertising of rewards on RVM display screens.

Social media

- Posts across City of Sydney Facebook, Instagram, Twitter and LinkedIn accounts.

Traditional media

- Media releases; and
- City of Sydney website.

Media launch

- Trial officially launched by Clean-Up Australia founder and Chairman, Ian Kiernan, AO, and Executive Director of the Total Environment Centre and Boomerang Alliance, Jeff Angel.

Art Installation

- 10-cent coin artwork installation at Circular Quay.

The bulk of the marketing activity for the RVM trial was carried out in June 2014. Ongoing marketing communications have been negligible and at the moment are limited solely to one page on the City of Sydney website.



Art Installation

At the time of launching the first two machines, City of Sydney displayed a giant 10-cent coin art installation in front of Customs House at Circular Quay. Standing four metres tall, the installation was made of 2,000 “Thank you” water bottles and was lit by LED lights at night.

The intention of the coin installation was for the City to show its support for the introduction of a CDS and draw attention to the issue. The City deliberately created a beautiful piece that would entice people to share it on social media, start a conversation, and leverage the RVM trial to catalyse change.

With every container deposited into the RVMs during the trial, the machine user was offered a choice of rewards for “doing the right thing”.

Rewards

With every container deposited into the RVMs during the trial, the machine user was offered a choice of rewards for “doing the right thing”.

When developing the RVM rewards the City consciously chose incentives that met all of the following criteria:

- Economically sustainable;
- Linked in with other City initiatives;
- Promoted sustainable behaviours and did not result in more waste being produced; and
- That were still appealing to people.

Four different types of rewards were offered as outlined in the table below. Options 3 and 4 were included for those people who did not want or need a reward.

Finished your drink?
Recycle it here for prizes.

RECYCLE TO WIN TICKETS FOR MOVIES, BUS TRIPS, EVEN...
NYE!

DON'T NEED REWARDS?
Then choose the Good Karma option and good luck will come your way!



DON'T TRASH IT TRADE IT!

Table 1 : RVM Rewards – City of Sydney RVM Trial

Reward Type	RVM Rewards
1 Large prize draws	<ul style="list-style-type: none"> – Double pass and family pass to New Year’s Eve fireworks events – Double pass to Sydney Harbour Bridge climb experience – Double pass to Moonlight Cinema – iPad mini
2 Instant wins	<ul style="list-style-type: none"> – Two for one meal voucher for use at food trucks – Free pass to City of Sydney swimming pools – One in 20 chance to win a bus ticket
3 Donations	<ul style="list-style-type: none"> – 10-cent donation to Clean Up Australia – 10-cent donation to Oz Harvest
4 No reward	<ul style="list-style-type: none"> – “Good Karma” reward

Reverse Vending Machine Trial



Evaluation

The City undertook a comprehensive program of evaluation as part of the trial in order to assess the results and outcomes of the RVM project.

Table 2 : Project Evaluation Measures – City of Sydney RVM Trial

Date	Evaluation Method	Method Description
March 2015	Intercept survey	Face-to-face surveys with 100 RVM users or people nearby to the machines at Haymarket and Circular Quay.
March 2015	Online survey	Online survey of 101 CBD residents or commuters.
March 2015	Online survey	Online survey of 197 Envirobank rewards' members. This survey targeted people who joined the rewards scheme after the RVM trial had begun and who lived locally.
June 2014 January 2015 June/July 2015	Public place bin audits	Physical audits of the contents of public place bins in the vicinity of the RVM sites before and during the trial.
April 2016	Intercept survey	Face-to-face surveys with 103 people passing by the RVMs who either lived, worked, or studied locally at Wynyard and Redfern.
April 2016	Public place bin audits	Physical audits of the contents of public place bins in the vicinity of the RVM sites and at similar sites without RVMs (i.e. comparison sites) in the same location. Total eight sites (four RVM sites and four comparison sites).
April 2016	Litter surveys	Litter surveys in the vicinity of the RVM sites and at similar sites without RVMs (i.e. comparison sites) in the same location using the NSW EPAs Local Litter Check method. Total eight sites (four RVM sites and four comparison sites).
Ongoing	Data analysis	Analysis of data on containers deposited and rewards vended from the Envirobank data portal.



What We Found

Bin Audits and Litter Surveys

Public Place Bin Audits

Gathering comparable and meaningful data through the public place bin audits conducted as part of the RVM trial evaluation was challenging because the City's street cleansing team empties public place bins around the City multiple times daily. The bin audits, undertaken in April 2016, compared the quantity of aluminium cans and PET bottles in public place bins at the RVM sites versus nearby comparison sites with similar characteristics to the RVM sites, but no machines. The results indicated that the quantity (number of containers per litre) of cans and bottles in public place bins at RVM sites was lower than the quantity of these containers in bins at the corresponding comparison sites at, three out of four locations (Haymarket, Wynyard, and Circular Quay). This result suggests that the RVMs encourage people to recycle at these public sites.

Litter Surveys

Results of litter surveys undertaken at RVM sites and nearby comparison sites in April 2016 indicated that all four RVM sites scored higher (that is better) overall than their corresponding comparison sites in terms of site cleanliness and amount of litter present.



All four RVM sites scored higher overall than their corresponding comparison sites in terms of site cleanliness and amount of litter present.

What We Found



Online and Intercept Surveys

Online Surveys

Results of the online surveys revealed:

- **Low awareness:** Awareness of RVMs was low among CBD residents and commuters. Only 19 per cent of respondents had seen or were aware of the RVMs (n=101);
- **High conversion:** The conversion rate from awareness to usage was strong, with 42 per cent of those who had seen an RVM indicating that they had used a RVM (n=19);
- **Strong regular use:** Of regular RVM users, 33 per cent indicated they use an RVM machine at least once a week (n=205);
- **More RVMs equals more recycling:** 95 per cent of respondents or 19 out of 20 people indicated that if an RVM was located close to their workplace or home, they would use it (n=216);
- **Rewards promote recycling:** 93 per cent of survey respondents said they would recycle more if an incentive was offered (n=298);
- **Cash is king:** four out five people (80 per cent) indicated that a cash reward was their preferred reward for recycling and that they would recycle more if a 10-cent cash refund was offered (n=298);
- **Less litter:** 30 per cent of people indicated they thought there was less litter in the area since the installation of the RVMs (n=209); and
- **Overwhelming support for a CDS:** 94 per cent of people stated they would support the introduction of a CDS in NSW (n=298).

Intercept Surveys

Many of the results of the intercept surveys mirrored the results of the online surveys including:

- **Low awareness:** 59 per cent of respondents had not seen an RVM before (n=100) and only 22 per cent of respondents had used an RVM before (n=203);
- **Strong regular use:** Of regular RVM users, 45 per cent indicated they use an RVM machine at least once a week (n=44);
- **More RVMs equals more recycling:** 92 per cent of respondents indicated that if an RVM was located close to their workplace or home, they would use it (n=100);
- **Rewards promote recycling:** 79 per cent of survey respondents said they would recycle more if an incentive was offered (n=100);
- **Cash is king:** 86 per cent of respondents indicated that they would recycle more if there was a financial reward attached (n=100); and
- **Overwhelming support for a CDS:** 95 per cent of respondents stated they would support the introduction of a CDS in NSW (n=100).

Across all surveys the results indicated that the main barriers to usage of RVMs were a lack of awareness (hadn't seen an RVM before) and lack of knowledge about RVMs (didn't know how one works).

There was a consistent message across both survey types that people would like to see RVMs in many more locations.

What We Achieved

By 31 May 2016, the City's RVMs had collected 159,655 containers, equivalent to nearly 2.3 tonnes of material for recycling.

Containers Recycled

During the trial, the City of Sydney's public place Reverse Vending Machines have processed some of the highest numbers of containers in Envirobank's RVM network nationwide.

Aluminium Cans

49,595



Container Types Deposited

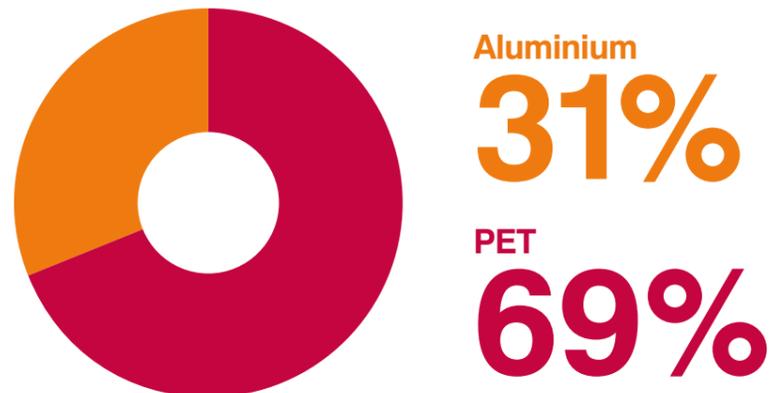
RVM users deposited more than twice the amount of plastic PET bottles (110,060 bottles equivalent to 1,522kg) compared to aluminium cans (49,595 cans equivalent to 739kg) into the machines.

PET Bottles

110,060



Figure 1 : Container Types Deposited (no. of containers) – City of Sydney RVM Trial



What We Achieved



The environmental benefits of the containers recycled through the City's RVM trial to date include:



Material recycled

159,655 containers

= nearly 2.3 tonnes of material



Landfill space savings

26.5m³ space saved

= 110.3 wheelie bins full of material



Greenhouse gas abatement

13.2 tonnes CO₂

= permanently removing 3.2 cars from our roads



Energy use savings

200.2 gigajoules

= the average energy use of 9.3 households per year



Water use savings

103.3 kilolitres

= enough water to fill 2.3 average domestic swimming pools

*Figures calculated using the NSW Environment Protection Authority's 'Recyclator' <http://www.epa.nsw.gov.au/recyclatorapp/default.aspx>

Reverse Vending Machine Trial



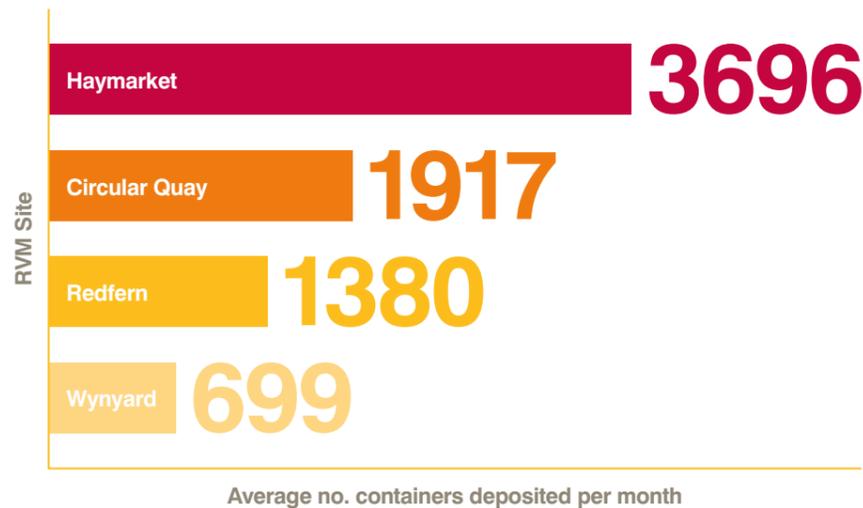
Site Performance

Of the four sites trialled, Haymarket was by far the most popular for an RVM. On average 3,696 containers were deposited at the Haymarket RVM per month. This was almost double the amount of containers deposited at the next-best performing machine, which was the Circular Quay RVM (average 1,917 containers per month).

The high patronage of the Haymarket RVM is believed to be because there is a large local residential population living in apartments near the site and because the local people loved the reward vouchers.

Prone to vandalism and therefore periods of downtime, Wynyard has proven to be the poorest performing site for the RVM trial.

Figure 2 : RVM Site Performance – City of Sydney RVM Trial



Of the four sites trialled, Haymarket was by far the most popular with an average 3,696 containers deposited per month.

What We Achieved



Rewards Vended

To date 52,292 rewards have been issued to RVM users during the trial. The large prize draws have proved to be the most favoured rewards, accounting for 48 per cent of all rewards issued so far.

Donations have also been a popular option, representing 28 per cent of all rewards issued. As a result, a total of \$1,479.30 has been donated to Clean Up Australia (\$810.40) and Oz Harvest (\$668.90).

The ratio of containers deposited to rewards vended has so far been around 3:1; indicating that people have chosen not to select a reward for two out of every three containers deposited through their RVM transactions.

Figure 3 : RVM Reward Preference – City of Sydney RVM Trial

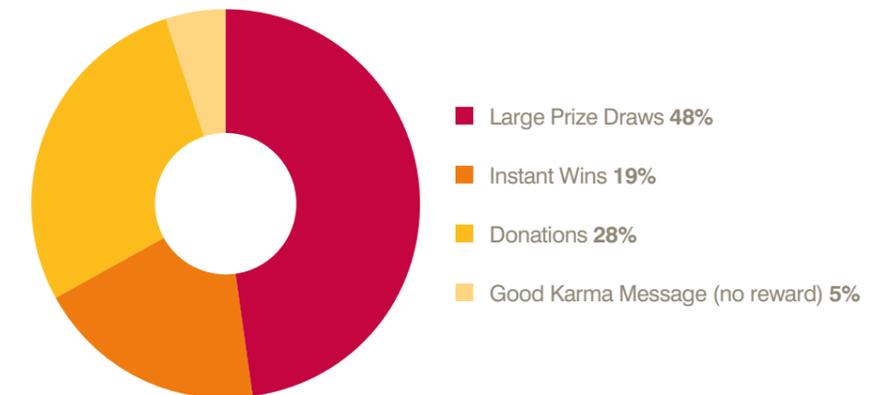


Table 3 : Number of RVM Rewards Issued – City of Sydney RVM Trial*

	Food Truck Vouchers	Bridge Climb Competition	NYE Competition 2015	Moonlight Cinema Competition	IPad Competition	Clean Up Australia Donation	Oz Harvest Donation	Bus Ticket	Pool Pass	Good Karma Message	Total
Number of rewards issued up to 31 May 2016	6,711	1,569	9,147	2,981	11,578	8,104	6,689	2,115	1,253	2,445	52,592
Per cent of total rewards issued	13%	3%	17%	6%	22%	15%	13%	4%	2%	5%	100%

*It should be noted that not all of the rewards were available for the same amount of time (eg. the pool passes and Moonlight Cinema prize were offered for a short period over the summer holiday period) and this factor would have had an influence on the data.

Reverse Vending Machine Trial



What We Achieved



Marketing Reach

The marketing campaign for the RVM trial was highly successful. It attracted wide media coverage and created strong public interest and engagement.



Outcomes versus Objectives

A summary comparing the outcomes of the RVM trial to the project objectives is provided in the table below.

Table 4 : Marketing Reach – City of Sydney RVM Trial

Media Type	Mediums	Reach
Traditional	TV, radio, print, and online	20 high profile media pick-ups of the launch both locally and overseas including: <ul style="list-style-type: none"> – Channel Ten News – 2UE – Nine MSN – Junkee – The Project – 2GB – Concrete Playground – TimeOut
Social Media	Facebook	<ul style="list-style-type: none"> – 900 shares – 150 comments – Ranked as one of the top 10 most popular Facebook posts for the City of Sydney
	Twitter	<ul style="list-style-type: none"> – RVMs were tweeted about 186 times by 171 contributors over eight days – Reached more than 243,000 accounts
	LinkedIn post	<ul style="list-style-type: none"> – 477 likes – 45 comments
	Instagram (10-cent installation)	<ul style="list-style-type: none"> – 601 likes
Internet	RVM page on City of Sydney website	<ul style="list-style-type: none"> – Third most viewed page on the City of Sydney's website during launch week – 6,612 page views

Table 5 : Project Outcomes versus Objectives – City of Sydney RVM Trial

Objective	Outcomes	Objective Met
1 Determine whether RVMs are an effective way to enable and encourage public place recycling	<ul style="list-style-type: none"> – 159,655 containers or 2.3 tonnes of material were deposited for recycling through City of Sydney RVMs; – The quantity of RVM compatible containers in public place bins was found to be lower at RVM sites than at corresponding comparison sites at Haymarket, Wynyard, and Circular Quay (April 2016 bin audit results). This suggests that the RVMs are encouraging public place recycling at these sites; and – 94% of people stated they would use an RVM to recycle if it was conveniently located (combined results of online and intercept surveys). 	✓
2 To provide cleaner streets by reducing litter from beverage containers	<ul style="list-style-type: none"> – All City of Sydney RVM sites rated better than corresponding comparison sites in terms of site cleanliness and amount of litter present (April 2016 litter survey results); and – 30% of people indicated they thought there was less litter in the area since the installation of the RVMs (March 2015 online survey results). 	✓
3 To raise awareness and promote the benefits of container deposit schemes	<ul style="list-style-type: none"> – The project actively tested and promoted the concept of an incentive-based container recycling scheme (CDS); and – City of Sydney leveraged the opportunity to make a statement about the merits of a CDS and the City's support for one through the marketing campaign for the RVM trial. Project marketing initiatives, in particular the large 10-cent coin art installation, attracted a great deal of attention. This effectively put CDS in the spotlight, making it a public discussion point, and gave impetus to the introduction of container deposit legislation in NSW. 	✓

What We Learned

Table 9 : Operational Learnings – City of Sydney RVM Trial

Management Task/Issue	Learnings
Siting machines	<ul style="list-style-type: none"> – Finding suitable sites to install the machines in the public domain was challenging and time consuming; – Multiple factors had to be considered or managed at each site including: <ul style="list-style-type: none"> • Power access; • Illumination; • Pedestrian and cycle traffic flows; • Proximity to where beverages are purchased and consumed; • Terrain (need level surface); • Availability of a wall or surface to position the machine against; • Planning restrictions or requirements; and • Stakeholder engagement i.e. gaining support for machine from surrounding businesses and building owners, consultation with managers of train and bus stations and street furniture service providers; and – Given RVMs are still a new concept in Australia and that most people are unfamiliar with the machines, sites need to be highly visible and supported with an active and ongoing marketing campaign so people know what RVMs are and how to use them.
Installation	<ul style="list-style-type: none"> – Installation and removal required approximately half a day per machine depending how complicated it was to make the electrical connection to the power source and secure it to the pavement or wall; and – The best time to install a machine was a Monday or Tuesday so that there were three to four working days available to iron out issues and monitor closely before the start of the weekend.
Machine functionality	<ul style="list-style-type: none"> – Users enjoyed the interactive experience and novelty value provided by the machines; – Limited material types accepted by machine in turn limited the recycling potential; – Machine model has limited storage capacity for recovered containers and continuous monitoring by Envirobank was required to ensure machines remained functional, with as little downtime as possible each time a machine needed emptying; – The current service model requires on-site storage of recycling bin(s) to hold recovered containers until the recycler comes to collect. This can be an issue in inner city locations where bin storage space is typically unavailable in the public place. This in turn creates the need to form operational partnerships with a nearby building owner to reach an arrangement for storing and ensuring access to the recycling bin for both the technician and recycling collection contractor; – Machine model vends printed coupons as the reward for recycling which causes the potential to create litter; and – The RVM technology employed for the City's trial was designed for use in non-deposit markets (i.e. to vend customised rewards and collect low, container-return volumes). Larger, faster, and more sophisticated RVMs will be required to service the large-scale needs of the NSW CDS market.

Operational Learnings

The RVM trial brought to light a number of valuable operational management insights which are summarised in the table below.

Management Task/Issue	Learnings
Maintenance	<ul style="list-style-type: none"> – The machines needed emptying and cleaning frequently; – Machine skins were easily scratched, though generally lasted better than expected in the elements. Re-skinning of machines requires the old skin to be removed, and a new skin applied; – The Perspex rain hoods were easily marked by fingerprints and needed regular cleaning; and – Over time, dirt and grime built up in the screw fix points for the rain hood attachment.
Servicing	<ul style="list-style-type: none"> – Continual monitoring of the RVMs by Envirobank was required to ensure that any technical issues that arose were dealt with in a timely fashion and the machines remained functional.
Vandalism	<ul style="list-style-type: none"> – Machine vandalism was an issue only at the Wynyard site and this resulted in some downtime for this machine; and – Some intentional damage to the graphic skin panels was found on the Haymarket machine.
Rewards	<ul style="list-style-type: none"> – The detailed data available from the Envirobank portal (e.g. info on number of coupons vended versus redeemed) enabled leveraging of value proposition to rewards partners; – Some reward options, such as bus tickets and pool passes, required involvement from third parties like convenience shops and the City had no control over the reliability of the service that these third parties offered customers redeeming reward vouchers; – Ongoing administration was required for the rewards, including monitoring reward coupons vended versus redeemed in cases where there was a limited supply or set budget for certain rewards; – Prize draw rewards enabled prize-related communications; – Reward concept enabled involvement from site partners (i.e. redeeming of coupons for some reward options such as bus tickets); and – There was an ongoing cost to provide some rewards (eg. donations).
Marketing	<ul style="list-style-type: none"> – Among the strengths of using RVMs to increase public place recycling from a marketing point of view are the easily customisable LCD-screen displays and the machines themselves, which provide a focal point around which to launch localised campaigns; and – As indicated by the RVM user surveys, RVM awareness was low but the conversion rate from awareness to usage was strong. An ongoing marketing campaign and marketing activity is required to drive and maintain higher levels of RVM awareness and use.
Other	<ul style="list-style-type: none"> – A limitation of using RVMs to increase public place recycling is the number of machines in the network. A small number of machines limits the scope of improvement in public place recycling behaviours in the wider community; and – While RVMs will only provide part of a broader collection network solution for the NSW CDS, new generation RVM technology will provide excellent opportunities for retailers, charities, and councils to install turnkey, convenient, and compact container return sites across high-density urban areas that will greatly reduce beverage container litter and generate income.

What Next?

The City's RVM trial has been instrumental in raising awareness and bolstering support within the community and among state government ministers for CDS and has given impetus to the development of the NSW scheme to be introduced in July 2017.

Under the NSW CDS a commercial market will rapidly be created around container takeback logistics with RVM technology playing a key role. The City's RVMs serve as live examples of this technology and symbolise the City's pro-CDS position and commitment to leading the way by demonstrating and testing infrastructure that will be a game changer for the way people recycle under the new CDS.

The City is backing its commitment to leading the way to a CDS by continuing the RVM trial for another year. However it will scale back the scope of the project. In early July 2016, the City will decommission the Haymarket and Wynyard machines. The machines at Redfern and Circular Quay will remain operational in order to continue to raise awareness, generate data and provide operational insights to support the NSW CDS.

This final stage of the project will conclude around the same time as the commencement of the NSW CDS. The City of Sydney anticipates that the CDS Scheme Coordinator, appointed by the NSW Government, will provide a network of more advanced commercial-scale RVMs and collection depots to meet consumer demands under the NSW CDS, thus superseding the City's leased RVMs.



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