

Ditching Disposables Stirling

Summary Report

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Contents

1	Introduction	1
1.1	Pilot scheme aims and concept	1
1.2	Pilot schemes delivered	1
2	The café scheme	3
2.1	Findings and impacts	3
2.2	Key learning for roll out and good practice	4
3	The event scheme	7
3.1	Findings and impacts	7
3.2	Key learning for roll out and good practice	8
4	The venue scheme	10
4.1	Findings and impacts	10
4.2	Key learning for roll out and good practice	11
5	Concluding comments	12
5.1	Impacts	12
5.2	Policy change for success	12
5.3	Sources of further information	12

1 Introduction

1.1 Pilot scheme aims and concept

This summary report provides headline information about the Ditching Disposables Stirling pilot project. A further, more detailed, long-form report is available to download from the Zero Waste Scotland website.

Funded by Zero Waste Scotland, and delivered by Green Gain and Transition Stirling, Ditching Disposables Stirling was a pilot to trial a returnable scheme for reusable cups. It aimed to find a solution to the 388.7 million single-use beverage cups used every year in Scotland [1].

Instead of providing customers with another reusable cup option to buy and keep, Ditching Disposables Stirling was designed to provide customers in Stirling with a cup that could be used, but conveniently returned so that it does not have to be carried around for longer than needed.

During the full period of the trial a combined total of 17,800 SU cups were displaced across the 3 activities, 1.136 tonnes of CO₂e were saved and the participating businesses achieved combined costs savings of £2,225 in outgoings. A breakdown of these results and activities are noted in figure 1.

1.2 Pilot schemes delivered

Three pilot schemes were delivered through the Ditching Disposables Stirling scheme:

Café scheme

The main pilot scheme involved establishing a city-wide network of 20 cafés to adopt Ditching Disposables branded, reusable, returnable cups and lids.

Figure 1: Summary of impacts

	Cups & lids	CO ₂ e	Cost
Cafés/ Shops	3,987	243 kg	£465
Events	610	37 kg	£92
Venues	13,203	856 kg	£1,668
Total	17,800	1,136 kg	£2,225

The returnable cups and lids were offered to customers for £1 deposit as an alternative to single-use disposable cups and lids. Once used, customers were encouraged to return their cup to any one of the participating members of the scheme to either get their deposit back, swap their cup for a fresh one, or get a refill in the same cup.

Figure 2: Example reusable cup



Event scheme

A smaller pilot scheme involved testing the cup scheme at local events. The cups were trialled

1 Powell, K., Letsinger, S., Sweeney, O., Cooper, B., Worth, C., Cole, G., Zero Waste Scotland and Resource Futures (2022). Consumption of Single-use Disposable Beverage Cups in Scotland and Impact of Policy Options Consumption of Single-use Disposable Beverage Cups in Scotland. [online] Zero Waste Scotland. Available at: <https://cdn.zerowastescotland.org.uk/managed-downloads/mf-0qjpu-bg-1686671922d> [Accessed 20 Feb. 2024].

at five events in Stirling, including two primary school summer fairs, two events run by Forth Environment Link (FEL), and also The Hub at the UCI World Cycling Championships time-trial event in Stirling. A range of methods were tested.

events for a £1 deposit, which was reimbursed on return at the end of the event.

Venue scheme

The venue scheme involved the Tolbooth and the Albert Halls, two of Stirling's premier events venues, managed by Stirling Council.

The pilot scheme involved issuing half-pint and full-pint reusable, returnable plastic cups branded for each venue. Customers were issued the cups as the only option for live

Figure 3: Venue pint/half pint cups

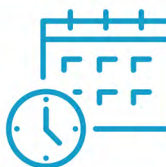


17,800

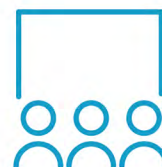
single-use cups were displaced across



Cafés & Shops



Events



Venues



1.136
tonnes C₂O
saved

participating
businesses saved

£2,225



in outgoings

2 The café scheme

No. cups & lids saved	CO ₂ e saving	Cost saving
3,987	243kg	£465

2.1 Findings and impacts

The café scheme had a total of 18 cafés and 2 shops involved. Over the course of the pilot project, the participating cafés and shops were asked to capture data on:

- Cups issued to customers
- Cups returned by customers
- Cups swapped (used for fresh)
- Cups refilled (using the same cup)

The resulting data was reported back to Green Gain by the cafés monthly via an online chat group.

Data from the 6-month duration of the pilot are illustrated in figure 5 (below).

Across the scheme, 1,761 cups were taken by customers, and 888 returned, which means around 50% are still in circulation with customers.

Figure 4: Café scheme cup in use

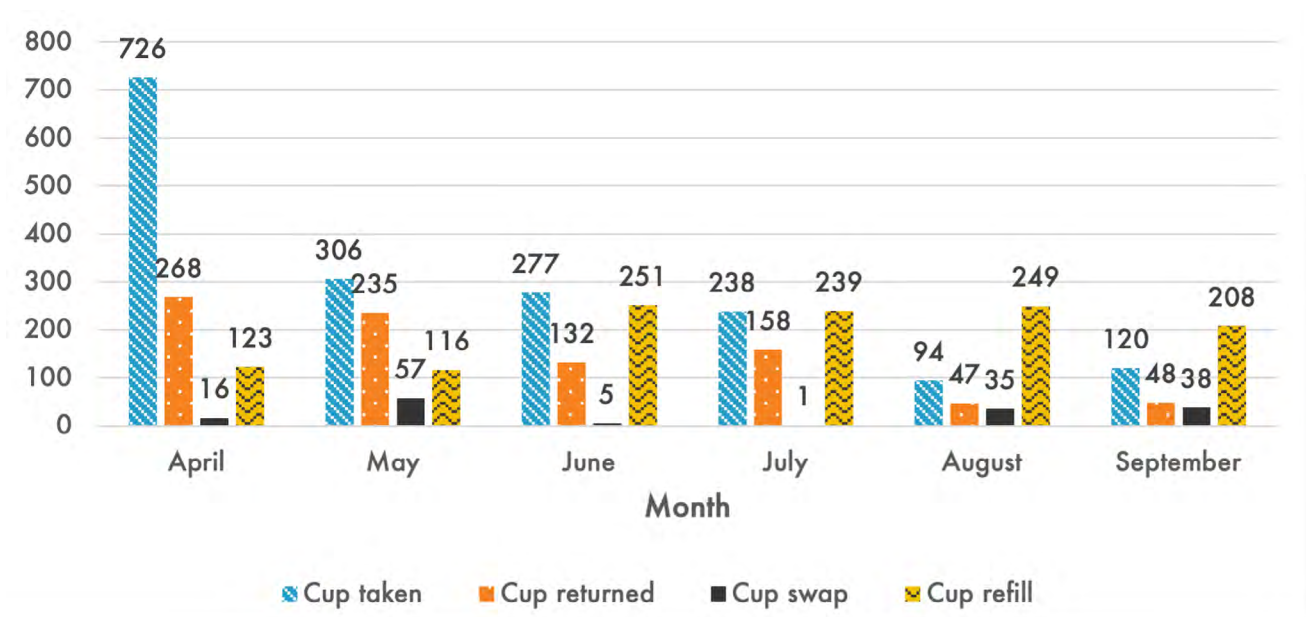


It was reported that 1,338 cups were either swapped or refilled during the pilot with the majority of these refilled (1,186).

Cafés reported that a high proportion of customers using the scheme preferred to keep the cups and have them refilled repeatedly rather than returning or swapping them. This implies that a proportion of the cups still in circulation are repeatedly being refilled for reuse.

Over the six-month pilot, a total of 3,987 single-use disposable cups and lids were displaced by reusables across Stirling. This is

Figure 8: Café Scheme - 6 Month Pilot Data (numbers of cups)



the minimum total based on recorded data, whereas the actual impact is anticipated to be higher.

2.1.1 Carbon reduction impact

A life-cycle assessment (LCA) by Frugal Cup [2] states that a conventional single-use cardboard cup has a carbon footprint of 0.061kg CO₂e [3], assuming the cup is landfilled at end-of-life.

Over the pilot the total cup usage was 3,099, with 888 cups returned, meaning these will be used again. The reuse total therefore comes to 3,987 cups. The reduction in CO₂e impacts relating directly to single use disposables avoided was 243kg of CO₂e (and very roughly 486kg CO₂e annually if we assume the same activity levels for the second half of the year).

Assuming an average cup weight of 0.016kg [4], the scheme has also diverted 64kg of cup waste from general waste (landfill or energy from waste).

Based on the Frugal Cup LCA, and research by the Sustainability Institute [5] (on cup washing impacts), it is estimated that each returnable cup given to customers would need to be reused approximately 3.73 times to become net positive, from a carbon impact perspective, compared to a standard single-use disposable cup.

Over 6 months a reuse rate of 2.3 times per cup was achieved - short of the breakeven target. However, this is the minimum reuse rate, and we know that reuses have been missed through errors with data capture and that there has been hidden activity with cups being used at non-participating cafés.

In addition, if the ongoing trend for cup usage

continued for the six months beyond the pilot, the reuse rate for the year would be 3.3, which would be much closer to the breakeven point for the cups.

2.1.2 Financial impact

The financial impact of the scheme is primarily to be found in the savings made by the cafés on purchasing new single-use cups and lids. An average standard single-use cup and lid costs approximately £0.15 [6].

Based on a total 3,987 single-use disposable cups and lids being displaced over 6 months, around £465 were saved across the scheme. Cost savings on waste costs may also have been achieved by the cafés using disposable cups for sit-in customers. Furthermore, some cafés also had retained deposits at the end of the project from unreturned cups.

The participating cafés all combined cups for washing in existing loads, stating there were no additional tangible costs associated with washing beyond small amounts of additional time loading and unloading the cups.

All of the cafés stated that, once up and running, there was little additional time and effort required to operate the scheme, beyond promoting this to customers, so no additional costs were incurred.

Each participating café received more exposure and promotion from participating in the pilot, although sales data was not monitored by the cafés as part of the pilot.

2.2 Key learning for roll out and good practice

All but four of the cafés involved in the scheme were keen for the pilot to continue in its current form as it added significant value to customers, and the environment, with little

2 FRUGALPAC (2020). New coffee cup study shows recycled paper coffee cup has 60% lower carbon footprint than normal cups and would save more than 200 billion litres of water and up to 200 million trees a year. [online] Frugalpac. Available at: <https://frugalpac.com/new-coffee-cup-study-reveals/> [Accessed 20 Feb. 2024].

3 Frugalpac (2021). Written evidence submitted by Frugalpac (PW0021). [online] UK Parliament. Available at: <https://committees.parliament.uk/writtenevidence/38828/pdf> [Accessed 20 Feb. 2024].

4 (Powell et al., 2022)

5 Yan, X. (2023). Carbon Footprint of the Circular Returnable Cup: A Preliminary Life Cycle Assessment.

6 Default cost used by Circular&Co. (n.d.). Circular Returnable Cup Calculator. [online] Circular&Co. Available at: <https://circularandco.com/cup-calculator> [Accessed 20 Feb. 2024].

additional effort required on their part. The remaining four cafés were in full support of the scheme but did not think it suited their specific set-up, primarily aimed at sit-in customers rather than takeaway.

Whilst the pilot activity was discontinued at the end of the 6-month trial, Transition Stirling would like to take the learning and use this to rebrand, enhance and relaunch the scheme in a way that builds on the pilot and overcomes the operational challenges experienced by

both the cafés and customers during the project.

2.2.1 Future requirements

The overall core of the pilot project was successful and provides a strong basis for replication in other towns and cities.

Useful learning from this pilot, which could be incorporated into any future schemes, includes the following:



A dedicated part-time member of staff

To proactively market the scheme, recruit new cafés, redistribute cups as required, gather/monitor data on performance, and promote its successes.



Service charge for cafés

Rather than a flat fee, a scaled charge related to the level of ongoing cup return activity is suggested. Any charge would need to fall within the monthly saving the café makes on purchasing single-use cups and lids. A service charge will be more viable with higher levels of returnable cup usage across the café network, as savings will be greater.



A new cup design

A rethink of the design, to make these more appealing to a younger audience, with the potential to generate a natural buzz about the scheme could potentially result in greater uptake and profile, whilst treading the fine line of not making them so attractive that people want to keep them.



Easier data handling

A system to simplify data capture using QR codes on the cups and scanners is likely to be more accurate than relying on till systems and manual data logging.



Electronic payments

Any future scheme would need all its membership cafés to accept electronic payment of deposits in and out of the scheme, as taking cash only poses a significant barrier to participation.



Extend the scheme coverage

It is suggested that any similar schemes being implemented seek to include any relevant key destinations which would help join up the scheme across the entire area and encourage wider engagement of these key customer types, for example tourist destinations, University or College.



Broader promotion leading up to the launch

This will quickly build scheme recognition and momentum with customers moving into a launch. Consideration should also be given to other influencing factors, for example given the large student and tourist population in Stirling more effort would be needed to engage these audiences via relevant bodies and media.

Messaging



The intention is for customers to use and return the cups at their convenience. Targeted messaging, referring to the cups as 'returnable', or 'borrowed' cups may help to adjust customer understanding of their purpose. Staff play a key role here at point of sale to raise awareness of the cups, their purpose, advantages, and to continually highlight the option to customers.

No deposits



An alternative approach to deposits could be considered by using a digital reusable cup system. With an app-based system, cups can then be taken without a deposit. However, if customers do not return cups within a specific timeframe, they are charged for the cost of the cup.

2.2.2 The impact of policy measures

The Scottish Government is considering introducing a charge on single-use disposable cups and has signalled that a future key milestone will be a public consultation to inform draft regulations [7].

Such a policy measure could have a profound impact on consumer behaviour in relation to reusable, returnable cups, such as those trialled by the Ditching Disposables Stirling Pilot.

When asked about proposals for a mandatory charge on single-use cups, all participating cafés were in favour. The majority believed that such a charge would encourage

customers to opt for the reusable returnable option to a much greater extent than they do currently. Some also commented that such a shift is essential for reusable, returnable cup schemes to truly work.

A couple of the cafés suggested the charge would need to be at a relatively noticeable level before it has an effect and be significant enough to offset customers' convenience to change their behaviour.

Whether a reusable, returnable cup scheme is developed on a national or local scale, the key learning is that it must be, quick, easy, and convenient for customers to use as well as for cafés to implement and operate.

7 The Scottish Government (2023). Single-Use Disposable Cups Charge Advisory Group minutes: June 2023. [online] [www.gov.scot](https://www.gov.scot/publications/single-use-disposable-cups-charge-advisory-group-june-2023/#:~:text=ST%20also%20signalled%20that%20a). Available at: <https://www.gov.scot/publications/single-use-disposable-cups-charge-advisory-group-june-2023/#:~:text=ST%20also%20signalled%20that%20a> [Accessed 5 Mar. 2024].

Figure 9: E-Cargo bike



3 The event scheme

No. cups & lids saved	CO ₂ e saving	Cost saving
610	37kg	£92

3.1 Findings and impacts

The event scheme provided alternatives to single-use disposables across five separate events. The event hosts were asked to capture data on:

- Cups issued to customers
- Cups returned by customers
- Cups swapped
- Cups refilled

The results are summarised in Figure 7 below.

A total stock of 180 cups and lids were used to supply the 5 events. Across those events there were 378 uses, with a further 232 refills, making a grand total of 610 uses.

The data from the two school events was very similar. At these events, cups were supplied directly from a drinks stall to customers in exchange for a deposit, which they received back on returning their cup. Refills were limited as customers would typically stay only long enough for one drink. The majority of cups were returned, but some customers did decide to keep them (10-15%).

Two events with Forth Environment Link (FEL) were run differently, with FEL paying the deposits to effectively hire the cups to supply their delegates for the two conference-style events. The food event was over a full day, with three formal breaks and therefore a much greater opportunity for refills. Around 25% of cups were kept by attendees and may have been a result of delegates mistaking the cups for gifts to keep rather than return.

Figure 5: UCI World Cycling Championships



The UCI World Cycling Championships saw the largest proportion of cups kept by customers with 53% (36 cups) retained. Customers paid a deposit for their cup but could then explore the various fan zones of the event across the city. It may have been more convenient for some customers to either

Figure 10: Venue Scheme - Pilot data from 5 events

Category	St Ninians Primary	Cambusbarron Primary	FEL Food Event	FEL Bike Event	UCI Event	Total
Cup taken	100	100	75	35	68	378
Cup returned	86	90	55	35	32	298
Cup swap	0	0	0	-	0	0
Cup refill	3	4	225	-	0	232

keep their cup or return it to a café nearby, hence the lower return rate.

3.1.1 Carbon reduction impact

A stock of 100 cups and lids were used as the basis for the event trials. Across the events, 80 cups were taken by customers and lost from the system. These were replaced, meaning that 180 cups and lids were used in total. Across the events there was a total of 610 uses.

On that basis, the reduction in CO₂e impacts relating directly to single use disposables avoided was 37kg of CO₂e (and very roughly 74kg CO₂e annually, if we assume the same activity levels for the second half of the year).

This makes for an overall reuse rate of 3.4, meaning that a net carbon saving will be achieved after 6 events. The reuse rate will continue to increase the more events delivered.

3.1.2 Financial impact

The financial impact of the event pilot was again centred around the saving on single-use cups that would have needed purchasing. With 610 single-use cups and lids being avoided in total, the direct cost saving across

the events was £92.

However, the event hosts also saved on waste and clean-up costs, along with washing the cups – a service which was provided by Transition Stirling. The cups were also perceived to add significant value to customers' overall experience.

3.2 Key learning for roll out and good practice

Transition Stirling found the events easier to manage than the café scheme. Whilst all the event hosts were keen to use the cups for events in the future with each having a programme of events running throughout the year. There is therefore a clear demand for this type of service in its current form.

3.2.1 Future requirements

The pilot tested the approach successfully, and Transition Stirling would convert this into a commercial service where customers are charged to use the cups for events. The following require further consideration for other similar schemes being introduced.

Pre-event promotion



Creating content and narrative describing the scheme and how it works for inclusion in programmes, in social media and in any other media promoting the event. This will ensure that customers are familiar with the cups and the approach prior to attending.

Commercial dishwasher



A commercial, rather than domestic, dishwasher would be much better suited for cleaning the cups, saving time on washing cycles. Drying racks for the cups would also be a useful investment to help speed up drying.

Participation agreement



Establishing a participation agreement which includes details on how cups should be prepared for collection at the end of events to prevent unnecessary mess. For example, the cups will need to be rinsed, stacked and stored in a bag or container for collection, or an additional charge will be levied.

Commercial charge



The pilot event hosts were all comfortable with a charge for the returnable cup leasing service. A menu of options is likely to be the most flexible option so that event hosts can choose which services they require.

3.2.2 The impact of policy measures

If the Scottish Government was to go ahead with a charge on disposable cups, the event hosts suggested that this would not change their approach as they are all fully on board with using reusable, returnable cups following the pilot.

However, this development would inevitably increase demand for similar services across Scotland.



4 The venue scheme

No. cups & lids saved	CO ₂ e saving	Cost saving
13,203	856kg	£1,668

4.1 Findings and impacts

Data was captured by Stirling Council for the returnable half/pint cup uses at each event at the Tolbooth and Albert Halls venues.

Data was captured over a 7-month period for the use of both half-pint and full-pint returnable cups. Stirling Council had to analyse data from its till systems in order to summarise the data.

Experienced bar managers were consulted at each venue to estimate the average number of refills at the events. This multiplier was applied to give the total usage figures (figure 9).

Over the course of the 7-month pilot period, the collective saving for both venues was 13,203 single-use cups (9,256 pint / 3,948 half-pint). Extrapolated for a full year, this would be 22,635 single-use cups saved (15,867 pint / 6,768 half-pint).

The total half/pint cup use is generally much higher for the Albert Halls, despite a lower number of events, as the venue is much larger, as is the average attendance.

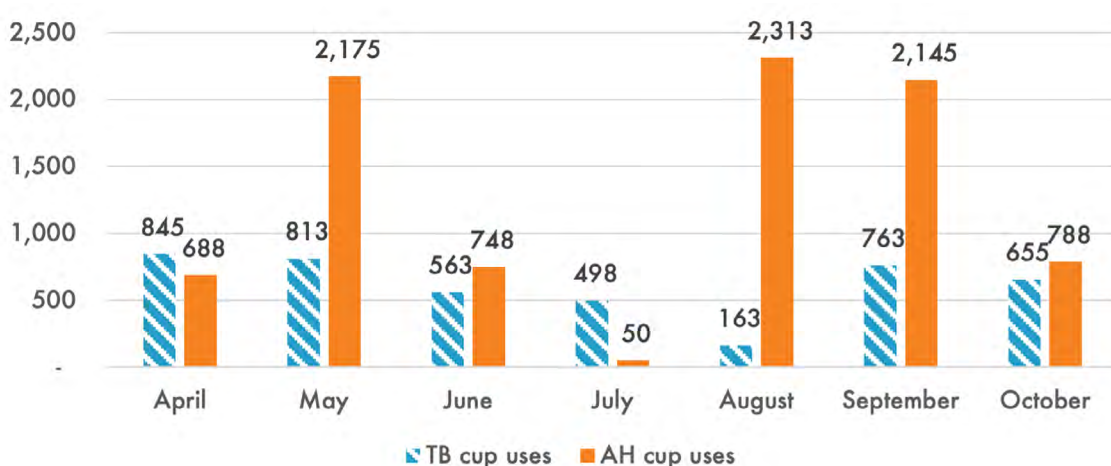
The average ratio of cups uses at the Tolbooth was 75% pint cups and 25% half-pint cups. At the Albert Halls it was similar with 70% of pint cups and 30% of half-pint cups. Bar managers estimated an average of around 2-3 half/pint cup uses per customer. The total stock of cups was counted at the completion of the trial and losses across both venues totalled 2%. Most of the losses were due to customers wanting to keep the half/pint cups as a souvenir.

4.1.1 Carbon reduction impact

The supplier of the half/pint cups for the venues trial is a company called Happy Cups, who refer to a lifecycle analysis (LCA) conducted by Hope Solutions [8]. Their LCA shows that the impact of a single-use disposable plastic cup is 70g CO₂e. In comparison, the impact of manufacturing a reusable polypropylene pint cup is 168g CO₂e, with the impact of washing the cup 6.2g CO₂e. The breakeven point for a reusable half/pint cup is therefore 2.6 uses.

With 13,023 half/pint cup reuses over the initial seven months, the reduction in CO₂e impacts relating directly to single use disposables avoided was 912kg CO₂e (and 1,563kg when roughly extrapolated over 12 months).

Figure 11: Reusable half/pint cup uses by month for the Tolbooth and Albert Halls



It should be noted that this figure does not account for the manufacture of the replacement reusable half/pint cups and their washing. If washing is accounted for across the pilot ($9,023 [9] \times 0.0062\text{kg} = 56\text{kg CO}_2\text{e}$) then the net impact is 856kg.

The reuse rate per cup for the 4,000 active half/pint cups is around 3.2. This means that the scheme has already exceeded the breakeven point for the active half/pint cups, with every additional use now generating further environmental benefit at a rate of 63.8g of CO_2e per single-use disposable cup avoided (accounting for the impact of washing).

Figure 6: Albert Halls Venue



4.1.2 Financial impact

The collective saving across both venues was 13,203 cups (9,256 pint / 3,948 half pint) at the end of the pilot. According to the venues, the typical price for a single-use disposable cup is around £0.10 per pint cup and £0.05 per half pint cup. The saving in the first 7 months was £1,120. If this data is extrapolated for a full year (22,635 cups), then the savings would be approximately £1,925. The payback on the initial investment in the half/pint cups would therefore be two years.

Some deposits accumulated where half/pint cups were not returned by customers and will be used for purchasing replacements as needed. The venues reported staff time savings on clearing up the cups after events. An estimate by the venues was an hour of staff time saved per venue – roughly £15-£20 per event.

The venues also significantly reduced the waste generated – roughly 20 uplifts of an 1100 litre bin per annum across the two venues. At a typical commercial rate of £26 per uplift [10], this could save Stirling Council an additional £520 [11] per annum (and roughly £28 in landfill tax). This brings total savings over the pilot to £1,668.

4.2 Key learning for roll out and good practice

Stirling Council was very satisfied with the performance of the half/pint cup scheme at both the Tolbooth and Albert Halls venues.

4.2.1 Future requirements

The scheme has had minimal negative impacts upon the existing operation of events. The only exception has been the additional washing and drying of the half/pint cups, particularly with back-to-back events. This was more than off-set by the improved customer experience, the reduced time spent cleaning up cups after events, and the reduced waste disposal levels. Both the Albert Halls and the Tolbooth are now continuing with the scheme on a permanent basis.

4.2.2 The impact of policy measures

Stirling Council plan to continue with the scheme to phase out single-use cups, therefore any policy changes will not be an influencing factor.

9 13,023 uses – 4,000 cup starting stock = 9,023 washes

10 Stirling Council (2024). Waste and recycling for businesses. [online] Stirling Council. Available at: <https://www.stirling.gov.uk/bins-and-recycling/waste-and-recycling-for-businesses/> [Accessed 5 Mar. 2024].

11 This includes: bin rental, collection and disposal, excluding VAT and landfill tax (LFT) charged at £102.10/tonne. WRAP's business waste weights calculator estimates the bulk density of an 1100ltr bin full of rigid plastics as 0.014tonnes. Based on 20 saved uplifts, the tonnage would be 0.28tonnes per annum. LFT would be ~£28.50.

5 Concluding comments

5.1 Impacts

The Ditching Disposables Stirling scheme has successfully piloted three projects to reduce the consumption and disposal of single-use cups.

The learning from these projects can be used to inform similar schemes looking to replicate this approach in towns and cities across Scotland. The headline impacts of the projects were as follows:

Scheme	No. cups & lids saved	CO ₂ e saving
Café	3,987	243 kg
Event	610	37 kg
Venue	13,203	856 kg

For all three schemes, the hosts and the customers, were very positive about the objectives, the cups and the operation of the projects. For the events and venue schemes, both will continue to operate in the future as they are relatively simple to operate with little risk. Such systems could easily be replicated by other organisations using the findings in this report.

The city-wide café pilot project proved a more challenging undertaking. However, the pilot project has proven that it is possible to establish and successfully operate such a scheme. There are many ways a scheme like this could be set up and the most appropriate way might differ depending on location. Practically testing this type of scheme has given Transition Stirling (and the participating cafés) the confidence that this can work with the right set-up and conditions in place.

5.2 Policy change for success

A key consideration is the role of Government policy in incentivising customers to choose

reusable returnable options through the introduction of a mandatory charge on single-use, disposable cups.

The experience of the café network in Stirling was that the uptake of a reusable, returnable option has its limitations without customers being given a financial incentive to make that choice. The evidence from the pilot demonstrates that discounts and rewards alone are insufficient to change behaviour on a significant scale. A mandatory charge on disposables, which all cafés must apply, would provide a level playing field and was seen by the cafés as a necessary step to change customer behaviour – and only then if this is set at the right level.

Figure 7: Cups in use at event



5.3 Sources of further information

If you are considering establishing your own scheme to replace single-use disposables with reusable, returnables, then there are a number of resources available that could help.

Zero Waste Scotland has established a [Ditching Disposables information hub](#).



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