



**ZERO
WASTE
SCOTLAND**

Cups Sold Separately

Field trial and evidence review
of disposable cup charges

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Many lifecycle assessments (LCA) have been done over the last two decades to compare environmental impacts of various disposable and reusable cups. While exact results vary, the overall conclusions do not; reusable cups have a lower environmental impact than disposable cups, provided they are reused enough times¹.

Reusable cups are typically heavier than disposable cups, requiring more material and energy to produce. As a result, the production of a single reusable cup will generate more CO₂eq. emissions than a single disposable cup however, the impact per use will decline the more times it is used, while the impact per use for a disposable is constant, being used only once².

The point at which the impact per use for a reusable cup falls below that of a disposable coffee cup, is the environmental 'break-even point', after which the reusable cup is environmentally superior.

The break-even point for a given reusable cup will depend on:

- its weight and material composition
- the weight and material composition of the disposable cup it is displacing
- how the two cups are disposed of and
- how and how often the reusable cup is washed between uses.

Fig. 1(a) for example, illustrates the environmental impact and energy investment of 500 disposable cups is far greater than 500 uses of a reusable cup.

Fig. 1(b) gives one example of the environmental break-even points for select reusables against a polystyrene disposable³.

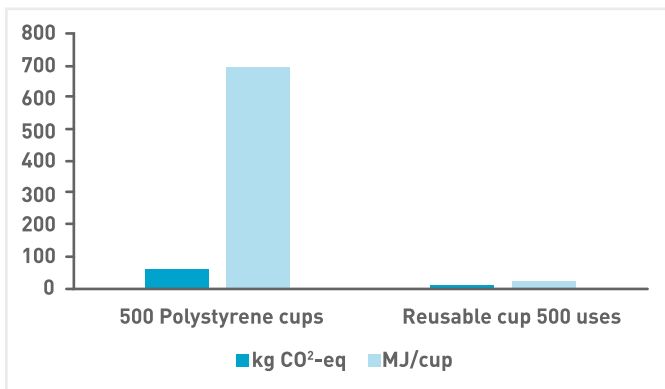


Figure 1(a). Environmental impact

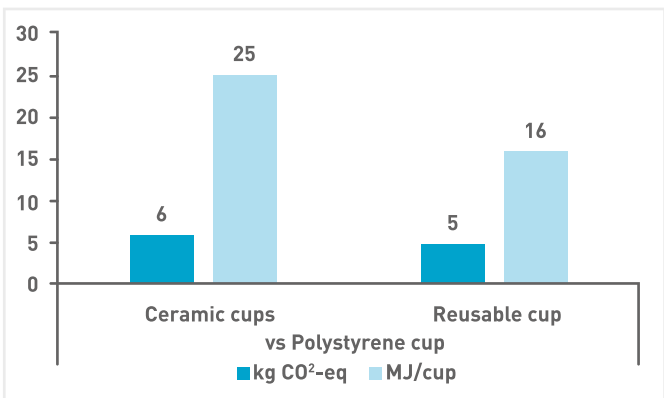


Figure 1(b). Uses required to break even

¹Hocking, M. (1994). Reusable vs. Disposable Cups. University of Victoria. ²Potting and Van der Herst (2015). Int J Life Cycle Assess 20:1143-1154. ³<https://docplayer.net/25480125-Lifecycle-assessment-reusable-mugs-vs-disposable-cups.html>

KEY FINDINGS:

Existing research on disposable coffee cup charges:

- Reusable cups are environmentally preferred to disposable coffee cups if used enough times.
- Numerous studies show disposable coffee cup charges are more effective than discounts at increasing reusable cup use.

Zero Waste Scotland's cost-neutral charge trial:

- Existing £0.05 and £0.10 reusable cups replaced with 'cost-neutral' disposable cup charges at 4 café retail sites
- Reuse rates increased across all sites (avg. 185%)
- Drink sales were unaffected by charge
- Customer survey found strong consumer support for DCC charge at national scale

Conclusion: Replacing reusable cup discounts with equivalent, cost-neutral disposable cup charges significantly increases reusable cup use at no extra cost to businesses or consumers.

Increasing reusable cup usage requires behavioural change on the part of consumers

To date, the principle way of encouraging reusable cup usage among consumers has been reusable cup discounts, whereby customers receive their beverage at reduced cost when taking it in a reusable cup. Until recently, most major coffee retailers in the UK offered a £0.25 discount (or equivalent). However, evidence indicates reusable cup discounts are ineffective at driving reuse behaviour, with reuse rates among major high street retailers consistently around just 1-2% of sales⁴.

One alternative to reusable cup discounts is a charge on disposable coffee cups whereby disposable cups are sold separately from the beverage itself. A growing number of studies indicate disposable coffee cup charges, which are similar in nature to the Scottish Single Use Carrier Bag Charge, are far more effective than reusable cup discounts at driving reusable uptake⁴. This method aligns with loss aversion theory, which finds people are more sensitive to perceived losses than perceived gains when making decisions⁵.

Literature review of disposable coffee cup charge studies

Poortinga & Whitaker (2017)⁴ (Fig.2)

A range of reuse interventions, including a £0.25 disposable coffee cup charge, were varyingly applied across several mixed University and Business café sites. Multivariate analysis was then applied to before and after sales and reuse rate data to determine each measure's impact.

The study found reusable cup discounts had no effect in reducing disposable coffee cup use, while the disposable coffee cup charge significantly increased the proportion of reusable cups with no impact on sales. It also found selling reusable cups on site, offering free reusables as a promotion, and clear communications positively affect reuse rates.

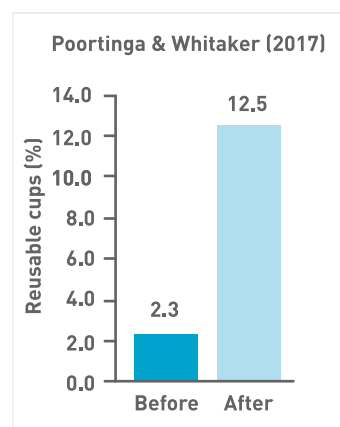


Figure 2. Poortinga and Whitaker (2017)

Deposit Return: Making RCs convenient and accessible – Kambe Sustainable Events⁷

Single-use plastic bar cups are a significant source of litter and waste at outdoor events such as sports matches and festivals. Reusable bar cups at outdoor events, sporting venues and clubs have been commonplace in many European countries for over a decade. In some parts of France and Germany it is even a license condition. Kambe Sustainable Events are bringing reusable (and recyclable) cups with a deposit return system to festival bars across the UK in 2019.

⁴Poortinga and Whittaker (2018) Sustainability, 10, 873. ⁵Barberis (2013) Journal of Economic Perspectives. 27, 1, pp 173-196.

Winchester University (2017) (Fig. 3)

Following involvement in the Poortinga & Whitaker (2017) study, Winchester University continued a £0.25 disposable coffee cup charge across 3 cafes and issued free RC to new and returning students at the start of term^{5/6}.

Although there was some difference between sites, this increased reusable cup usage from an average of 21% to 33%, saving approximately 65,000 disposable coffee cups in first year, with no reductions in sales over the same period⁶.

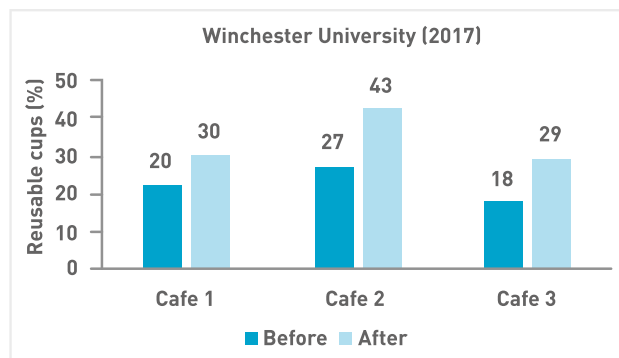


Figure 3. Winchester University (2017)

Starbucks (2018)⁸ (Fig. 4)

In a 2018 trial with the Hubbub foundation, Starbucks applied a £0.05 disposable coffee cup charge across 35 stores in London selected to represent 'typical' demographics⁷.

Despite the lower charge value, reusable cup rates more than doubled from 2.2% to 5.8%. Unsurprisingly, the study found that transient customers such as tourists and shoppers are more difficult to affect, whilst regular customers such as office workers and residents were most likely to change to reusable cups. Since the trial, Starbucks has rolled-out the charge to all 950 UK stores.

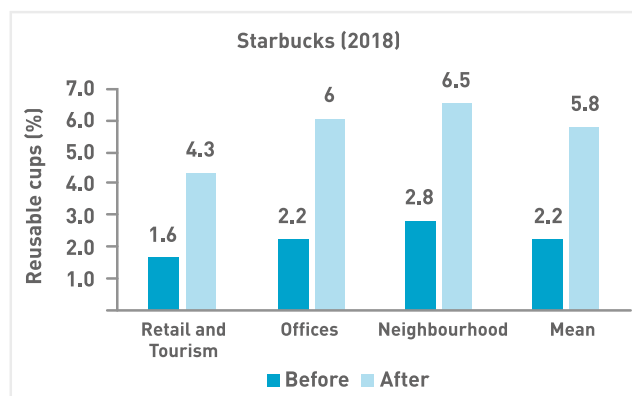


Figure 4. Starbucks (2018)

NHS Scotland University Crosshouse Hospital⁹ (Fig. 5)

The NHS Scotland, in partnership with Zero Waste Scotland, implemented a £0.10 charge on single-use hot drinks cups at University Crosshouse Hospital, Ayrshire, reducing the price of hot drinks accordingly to make it cost-neutral. In addition, paper disposable coffee cups and polystyrene soup cups were replaced with 100% recyclable polypropylene disposable coffee cups. Meanwhile, Crosshouse staff were provided with free, reusable and 100% recyclable PP cups. In addition to paying £0.10 less for their drinks, staff using any RC also obtained a stamp towards a free 10th drink. A survey was issued to assess staff views on the trial system.

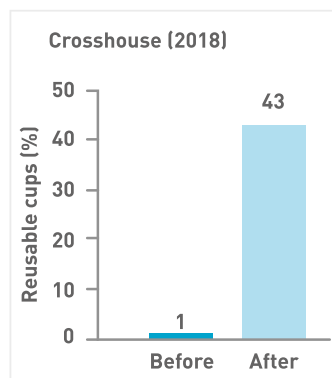


Figure 5. Crosshouse

During the trial, RC usage increase from 1% before intervention to 43%, reducing disposable coffee cups consumption by 157 a day, or almost 60,000 a year.

In addition, hot drink sales increased by 10% over the trial period, while survey data revealed strong support for the trial system from Crosshouse Staff, with 86% saying they'd like to see the system made permanent, 88% supporting rollout across the NHS Scotland, and 78% saying they'd like to see disposable coffee cup charges used more widely in Scotland.

⁶Chew Fancy a Brew? Presentation. University of Winchester (2018) ⁷<https://www.ncass.org.uk/mobile-catering-home/articles/managing-waste-and-sustainability-at-events> [accessed 12/10/18] ⁸ https://issuu.com/hubbubuk/docs/hubbub_starbucks_coffee_cup_charge [accessed 01/10/18] ⁹ Zero Waste Scotland Crosshouse DISPOSABLE COFFEE CUP charge trial (2018)

Other Charge Studies¹⁰

There are numerous organisations, institutions and businesses which have implemented or are currently implementing similar disposable cup charges. These include the University of California (Berkeley Campus) where a \$0.15 cost-neutral charge realised a 5.6% increase, and Tufts University in Massachusetts where a \$0.25 charge achieved a 5% increase (Fig. 6).

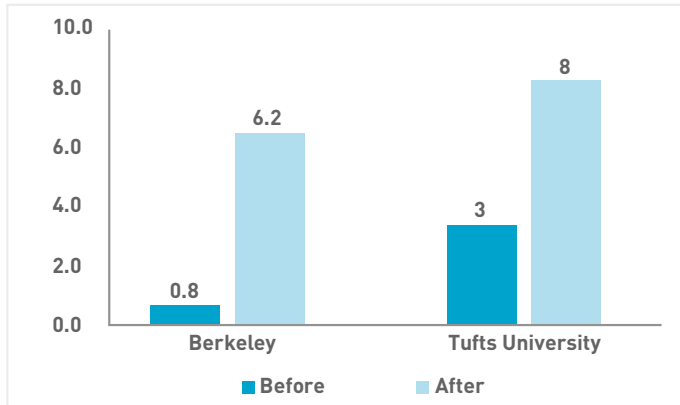


Figure 6. California University (Berkeley) and Tufts University reusable cup usage rates before and after cup charge was applied.

Zero Waste Scotland Cost-Neutral Charge Study

In response to public debate in the UK around an imposed £0.25 'Latte Levy', Zero Waste Scotland undertook a study to determine whether retailers can improve RC rates by simply replacing their existing reusable cup discounts with a cost-neutral disposable coffee cup charge.

Background

Zero Waste Scotland partnered with 2 public sector organisations to replace existing reusable cup discounts with a cost-neutral disposable coffee cup charge at four public sector catering locations over a five-week period. Organisation 1 (Org. 1) was an environmental organisation with a single coffee outlet, and Organisation 2 (Org. 2) was a local authority operating three separate outlets. Charges were £0.05 and £0.10 respectively

Methodology

Sales and reuse data from the five weeks before the trial, as well as the five weeks corresponding with the trial from the previous year were used as a baseline for comparison.

Social media, posters, email and verbal reminders from till operators were applied at each site to ensure customers were aware of the charge. An online survey was also issued to assess consumer experience and attitudes towards the charge.

¹⁰ https://serc.berkeley.edu/paying-the-price-of-disposable-cups-at-caffe-strada/#_ftn3 (accessed 06/10/18)

Results and discussion

Reusable cup usage increased at all 4 sites with an average increase from 20.0% pre-trial, to 29.6 (Fig. 7) %. Pre-trial reusable rate at Org. 1 was significantly higher than Org. 2 sites, as well as the pre-trial reusable rates observed in related charge studies. This may be due to an increased level of engagement and awareness on the part of staff due to environmental focus of their work. Zero Waste Scotland is also aware that a series of reusable cup campaigns had been conducted at the site previously. Nevertheless, despite this unusually high baseline rate, the charge significantly reduced disposable cup use at Org. 1.

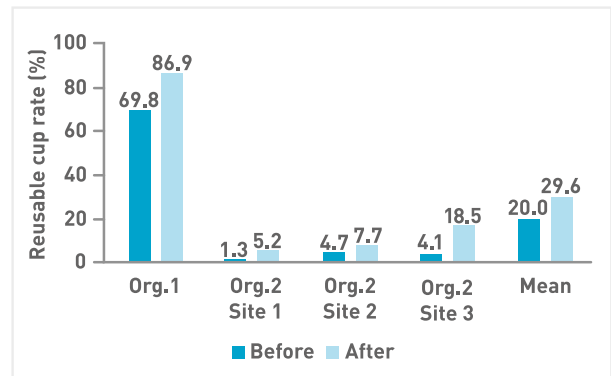


Figure 7. Comparison of reusable cup usage rates before and after cup charge was applied.

Org. 2's sites 1 and 3 experienced the greatest relative increases in reusable rate at 300% and 351% respectively, while Org. 1 had the smallest increase, though at 24.5% this was still significant, particularly considering the baseline rate (Fig. 8). Interestingly, Org. 2 Site 2's reuse rate increased by ~64% which, while significant, is far lower than sister sites, suggesting a site-specific effect which was not identified.

Overall, average increase in relative reuse rates across the sites was 184%, confirming, as per previous studies, that disposable coffee cup charging is a highly effective measure for encouraging reusable cup use, regardless of the specific charge value or other variables between organisations and sites.

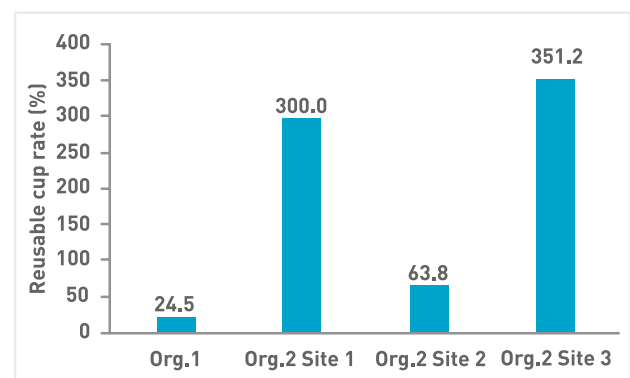


Figure 8. Increases in reusable cup usage rates after charge was applied.

Additional findings

Most survey respondents stated the charge made them reconsider using disposable coffee cups (Fig. 9a) and the majority supported charges on other single-use catering items (Fig 9b). Finally, most respondents said they would support the use of disposable coffee cup charges more widely (Fig 9c). The strong support for disposable coffee cup charging among respondents corroborates a national YouGov survey commissioned by the Marine Conservation Society, which found 74% of people in the UK support a government mandated DCC charge¹³.

Critically for the retail sector, and to address one of the major concerns around disposable coffee cup charging, this study fully corroborated the work of Poortinga & Whittaker (2017) and others, finding the charge had no significant impact on drink sales over the trial period.

Deposit Return: Making RCs convenient and accessible – The Freiberg cup¹²

The City of Freiberg, Germany (pop. 250,000) signed up 105 cafés (60-70% total) to a scheme whereby cafés receive reusable cups issued by the city, then provide these to customers in exchange for a €1.00 deposit. Customers can keep the cup or return it to any participating cafe for washing to re-enter circulation upon which they retrieve their deposit.

Notably, vendors were reluctant to impose parallel charge on DCCs to encourage customers to use the reusable cup.

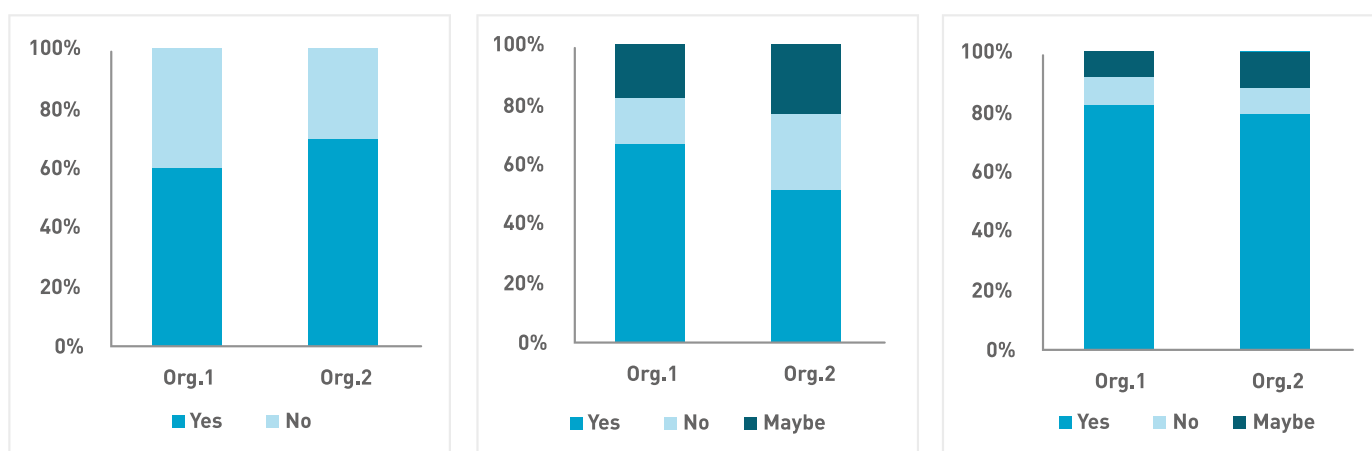


Figure 9. Other significant findings from questionnaires including (a) Answers to the question 'Has a charge made you think more about using disposable coffee cups?' (left), (b) Respondent support for a charge being introduced on other single use items (centre), and; (c) Respondents in support of the charge being implemented more widely (right)

Conclusions

Reusable cup discounts are ineffective at encouraging reusable cup use however, a growing number of studies prove disposable coffee cup charges are effective. A trial conducted by Zero Waste Scotland and 2 public sector partners found that **by simply replacing existing reusable cup discounts with an equivalent, cost-neutral disposable coffee cup charge, retailers can significantly increase reusable cup use without impacting sales, and with no cost increase to consumers.** These studies are summarised on the next page (Fig. 10). Although a DCC charge is far more effective than discounts at reducing disposable cup use, additional measures (such as a deposit return scheme for reusable cups) will also be required to ensure maximum uptake of reusable cups among consumers.

¹²www.sbs.com.au/food/article/2018/01/24/germany-citys-answer-disposable-coffee-cups-genius (accessed 01/10/18) ¹³M Fischer, "74% of Brits would support a charge on single use coffee cups", Marine Conservation Society, 2017.

| Study | Charge value | Other measures? | Reusable cup rate Before (%) | Reusable cup rate After (%) | Net change in Reuse Rate (%) |
|----------------------|--------------|-----------------|------------------------------|-----------------------------|------------------------------|
| Poortinga & Whitaker | £0.25 | Yes | 2.3 | 12.5 | 443 |
| Winchester | £0.25 | Yes | 22.0 | 34.0 | 55 |
| Starbucks | £0.05 | Yes | 2.2 | 5.8 | 164 |
| Crosshouse | £0.10 | Yes | 1.0 | 43.0 | 4200 |
| Berkeley (\$0.15) | £0.11 | No | 0.8 | 6.2 | 675 |
| Tufts (\$0.25) | £0.19 | No | 3.0 | 8.0 | 167 |
| Org. 1 | £0.05 | Yes | 69.8 | 89.6 | 28 |
| Org. 2 Site 1 | £0.10 | Yes | 1.3 | 5.2 | 300 |
| Org. 2 Site 2 | £0.10 | Yes | 4.7 | 7.7 | 64 |
| Org. 2 Site 3 | £0.10 | Yes | 4.1 | 18.5 | 351 |
| Average | £0.13 | | | | 644 |

Figure 10. Key findings from disposable coffee cup charge trials

Areas for future research

Given the wealth of evidence on the impact of disposable coffee cup charging, future research and pilots should focus on additional, complementary measures which are aimed at making reusable alternatives more convenient and accessible to consumers, such as a deposit return system for reusable cups. Furthermore, as a disposable coffee cup charge has never been implemented at a national level, consideration should be given to the practicalities of delivering such a policy. This work, the examples given, Best Practice from organisations implementing charges, and lessons learned from similar measures such as the Scottish Single Use Carrier Bag Charge could all inform this work.

Deposit Return: Making RCs convenient and accessible – reCup¹⁴

reCUP is a German company based in Munich which has designed and engineered a double-walled reusable paper cup of the same name, capable of being recycled in a standard paper recycling plant. An App shows participating sites. Consumers pay a 1 Euro deposit to obtain a reCup. Customers can then return the cup to any participating site, where it is washed (to 500 times) and reintegrated into stock, in exchange for their deposit. Commuters can purchase a coffee in Munich and return the cup in Berlin. reCup also sells collapsible lids which customers can carry with them and fit to any reCup.



¹⁴ <https://en.reset.org/blog/recup-coffee-cup-share-system-set-take-over-berlin-08102017> (accessed 06/10/18)

