WHERE DO WE GET OUR FIGURES FROM?

All the figures quoted in the factsheet come from trusted sources- either from industry studies (in the case of general event statistics) or from up to date climate science databases (in the case of environmental impact & CO2e).

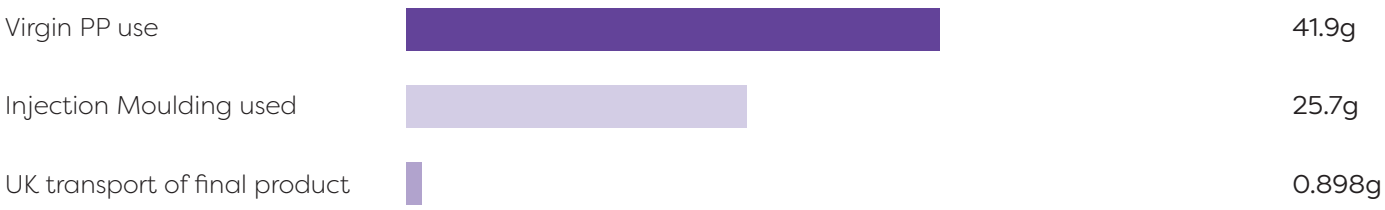
The general event statistics come mainly from this study, published by Eventbrite:

An Introduction To The UK Event Industry In Numbers: https://www.eventbrite.co.uk/blog/uk-event-industry-in-numbers-ds00/

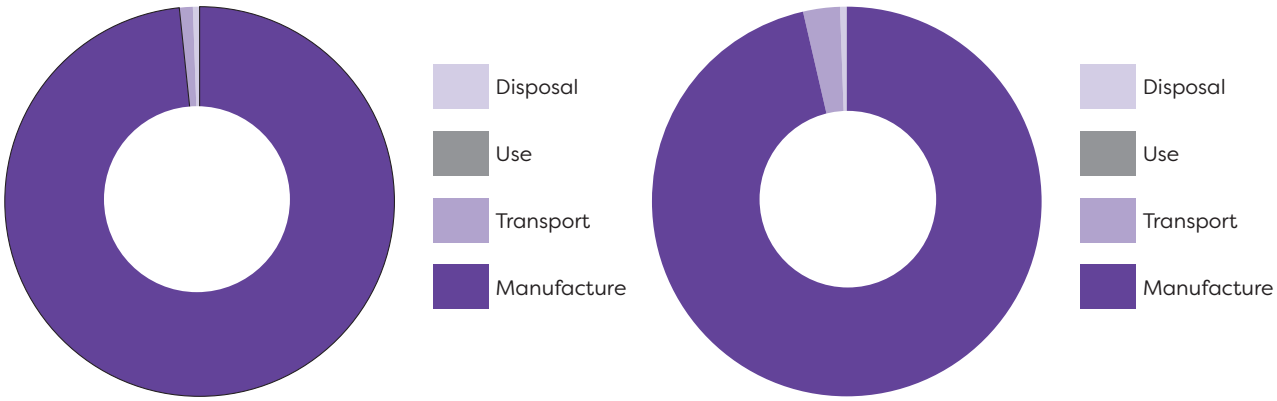
The general statistics on plastic come from Plastic Oceans Foundation and National Geographic: https://plasticoceans.org/the-facts/ https://news.nationalgeographic.com/2017/07/plastic-produced-recycling-waste-ocean-trash-debris-environment/

The claim that "Over 90% of the impact of these items comes from manufacture" is borne out by the Life Cycle Analysis (LCA) figures. Figures are calculated using LCA Calculator (http:/www.lcacalculator.com/) - see examples of impact data for UK produced disposable plastic and paper cups shown below and on cup washing page (figures are in gCO2e):

Major impacts - Disposable plastic cup



Major impacts - Disposable paper cup



The databases used to calculate these impacts include:
Bath Inventory of Carbon and Energy (ICE) - http:/www.ghgprotocol.org/Third-Party-Databases/Bath-ICE
The international ecoinvent database - http://esu-services.ch/data/ecoinvent/ and
The DEFRA greenhouse gas reporting: conversion factors 2017-
https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2017
These databases are used in the global reporting system, the Greenhouse Gas Protocol (http://www.ghgprotocol.org/), the world's most widely used greenhouse gas accounting standard.
These sources are the most up to date and comprehensive scientific datasets available today.

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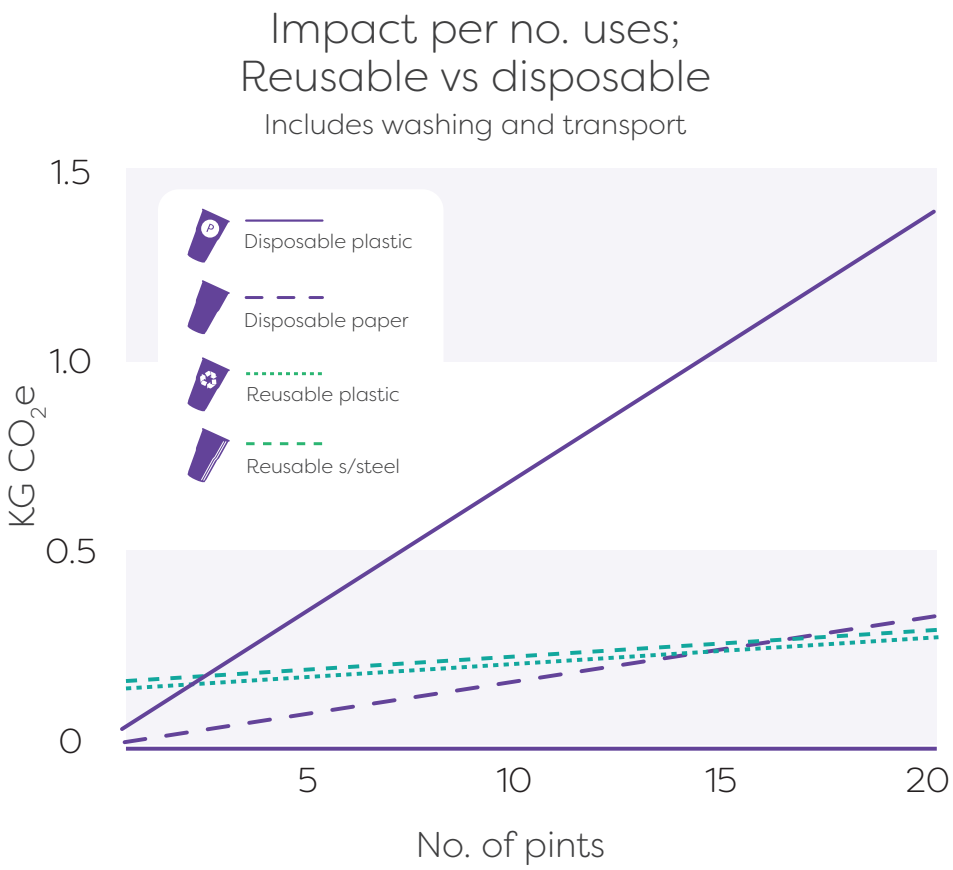
HOW CAN WE SAY THAT THE IMPACT OF REUSABLE CUPS IS LESS THAN DISPOSABLES AFTER LESS THAN 3 USES?

This is a very simple mathematical calculation, using the values calculated in the LCA.
If you look at the use of disposable cups - every time a drink is served, a new cup must be manufactured, supplied and disposed of. Therefore, if the CO2e impact of one drink in a PP plastic disposable cup is 70.0g, then it follows that the impact of 3 drinks served is 210g.
Conversely, if the impact of manufacturing a reusable cup is 168g CO2e but the cup is reused for a second and third drink, then the impact of the 3 drinks is not tripled, it stays the same. Add on the impact of washing the cup twice (12.4g CO2e) and that makes 180.4g for the reusable - 15% less than the impact of 3 disposable cups used for the same purpose.

If you substitute lightweight paper disposables for the plastic disposables, this 'breakeven point' occurs after between 14-15 uses. [N.B. This is based on 11.8g weight for the paper cup - breakeven point would occur sooner if the paper cup was a heavier grade such as a double walled hot drinks cup].

This is illustrated in the graph below:



It is also important to note that carbon footprint is not the only measure of impact. The impact of wasted resources should not be underestimated - e.g. for every 1,000 single use cups used, 20kg of material is discarded, mainly to incineration and landfill. Even if it is captured for recycling it is mainly downcycled into lower grade products, not returned into a 'closed loop' to make more of the same product.

HOW DID WE CALCULATE THE IMPACT OF WASHING?

The impact of washing is calculated based on the Hobart flight washing machine used by the main UK reusable cup supplier, Green Goblet, for washing reusable cups and using the standard recognised impacts of the process-

Cup washing machine statistics (per hour of operation)

- Water use - 130 litres
- Cup throughput - 3,750 cups [90,000 cups per day average]
- Energy usage - 16.7kWh

https://www.hobartuk.com/sites/all/files/site/pdfs/sales_brochures/flight-type-brochure-ftn-ftp.pdf

DEFRA standard conversion factors -

- Water Supply - 0.344 g CO2e/litre
- Wastewater Treatment - 0.708g CO2e/litre
- UK Electricity Mix 2017 - 351.5g CO2e/kWh

Add in the impact of transport, up to 200km [calculated from the LCA calculator].

This gives rise to an impact per cup as follows-

- Water Impact 0.036g CO2e /cup
- Energy Impact 1.56g CO2e /cup
- Transport Impact 4.55g /cup (PP reusable plastic cup)
- Transport Impact 5.08g /cup (Stainless Steel reusable cup)

Giving a total impact of washing of 6.182g CO2e for reusable plastic and 6.676g CO2e for the stainless steel equivalent.

It should be noted that the impact of washing and transportation of reusable cups is therefore less than 10% of the impact of manufacturing and supplying a new disposable plastic cup.

I.e. the impact of manufacturing a new disposable cup is more than 90% greater than the impact of washing and reusing an existing cup.

WHY DO OUR FIGURES DIFFER FROM PREVIOUS STUDIES?

We have used the most up to date scientific information for our calculations and have not used data from previous studies as the basis of our calculations.

Many recent studies have essentially been literature reviews which have concentrated on comparison and evaluation of previous studies, many of which are based on outdated data.

In particular, many studies have relied on historical calculations based on data from as far back as 24 years ago in 1994. This is important to note, since the impact of washing (particularly the energy footprint) has decreased considerably in recent years. This has been largely due to advances in washing technology and energy efficiency and also due to the ongoing decarbonisation of the energy supply - with UK electricity generation moving rapidly from being mainly coal and oil based, to being based mainly on gas and renewables.

We have also based our estimate of the long term use of reusable cups on the actual usage of cups in the UK marketplace. Figures provided by Green Goblet* show that they have roughly 2 million generic reusable cups in regular use in the UK. These are reused on average at 15 events per year.
*http://www.green-goblet.com/

Our figures for 1,000,000 reusable cups are based on this:

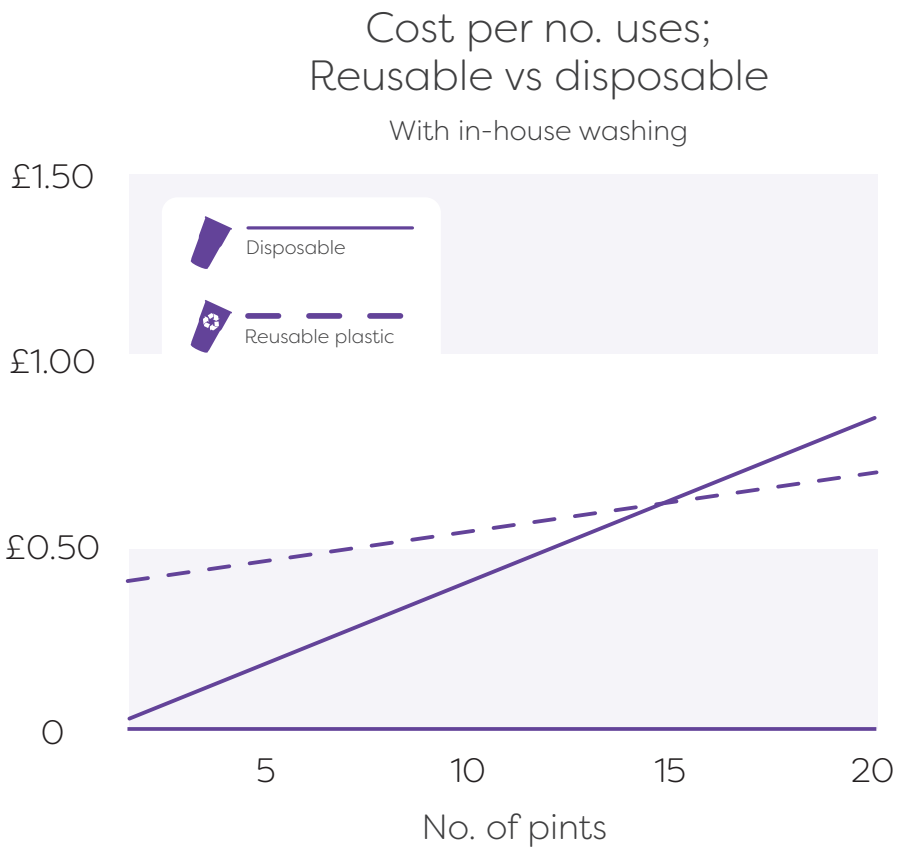
- For every million reusable cups, used 15 times a year, 15 million disposable cups are avoided.
- 1,050 Tonnes of CO2e would be avoided as a result (15,000,000 cups x 70g CO2e)
- 300 Tonnes of unnecessary waste are avoided (15,000,000 cups x 20g cup weight)

WHAT ARE THE COST IMPLICATIONS?

Cup ownership

We have shown that if washing is carried out in-house by the venue then costs of utilising reusable cups are repaid after between 14 and 15 uses of the reusable cup, compared to purchasing and disposing of single-use cups. This is due to the fact that the cost per use of purchasing the reusable cup is paid back over the number of reuses. This makes this option eminently financially viable in a fixed venue that has its own permanent bars and may serve thousands of drinks per event, over scores of events per year.

The graph below includes costs of purchasing cups and washing in-house by the venue. Use of a contract washing service for outdoor events would increase this cost to around 7p per cup use, but this could potentially be included in the cost of the drinks.



Cup rental with branding & merchandising

There is also the opportunity to pay for whole projects of purchase and washing (including for Stainless Steel Cups) through a deposit/sale scheme, where customers pay a fee or deposit for use of a cup and this revenue is retained by the event to pay for cup supply and washing.

This scheme also allows for a profit sharing arrangement where part of the income from branded cup sales & unreturned deposits becomes a revenue stream for the event. Effectively this is a merchandising opportunity.

Several such schemes are already in place at UK festivals and events which enable large scale event bars to run entirely on reusable cups, with no upfront cost.

ABOUT US

Luke Howell and Rob Scully have over 30 years combined experience with the practical implementation of environmental sustainability management and have worked with some of the most recognisable events in the UK to increase environmental awareness and reduce their impact.

Luke Howell

Luke is a multi-award-winning, delivery-focused, practical sustainability expert with specialist experience in event operations and logistics. Luke has worked with some of the industry's biggest events providing sustainability strategy, onsite implementation, auditing and successfully helping them reduce environmental impacts.

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Rob Scully

Rob is an environmental scientist who first got involved in festivals & events at Glastonbury Festival 20 years ago. He is now an experienced freelance event production and site manager, who works on a variety of environmental projects for events, including compiling Smart Power Plans to improve the efficiency of temporary power systems on site.

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