Scrapp

2025

THE RACE TO ZERO-WASTE 2025

“Is it easier to reduce, or recycle, our way out of the waste crisis?”

An industry-first report observing how consumer behavior can influence societal zero-waste goals.

Burlington, MA | info@scrappzero.com | scrappzero.com

CONTENTS

CONTENTS

INTRO

INTRODUCTION

We all create “waste”. The amount and the value of these “wastes” may differ, but in the modern world, it is nearly impossible to exist without generating “waste”. In 2020, Scrapp was formed to help individuals learn how to recycle correctly. The team began to aggregate data on the availability of recycling infrastructure across the United States. Since then, the dataset has expanded to other countries and goes beyond just recycling to enable a circular economy, totaling over 75,000 unique data points and counting.

While on this data-collection journey, we have encountered unique challenges and ideas about what will actually create a zero-waste future. With zero-waste and sustainability in general, it is not always the problem at face value, but the subtext underneath it. During the “A Year In Plastic” report, we found that waste footprints are a result of behavior.

At sports conferences, we have seen that reusable packaging is being adopted not because it's “green,” but because it reduces costs, and fans report that they spill their beer less with reusable cups. Zero waste living is adopted in the former and expands in the latter.

This year, we wanted to do something uniquely human that AI couldn’t replicate. This report was designed to answer a debated topic in the zero-waste space:

> **What has more of an impact, recycling or source reduction?**

This is a question we face every day, whether it be in packaging design, procurement systems, or individual purchasing decisions. This led Evan and Mikey to put their money where their mouths are (or, in this case, put our trash where our homes are) and conduct a month-long experiment on who could produce the least amount of waste possible after diversion tactics are applied.

METHODOLOGY

The goal of this challenge was to understand the impact that different consumer behaviors can have on the residential waste stream. The challenge had two participants, Evan and Mikey, and lasted 28 days.

AGE
28
LOCATION
UK/FRANCE
HOUSEHOLD SIZE
2
TEAM
REDUCE

Evan ravels a lot for work, and lives in a European city apartment of 2 adults. His approach represented a prevention-focused mindset, where he had to say no to as much waste as possible through his day-to-day activities. This included opting for reusable packaging options where possible, or minimizing plastic consumption. Whatever waste he produced at the end of the day was added to his running total for the challenge.

AGE
27
LOCATION
MA, USA
HOUSEHOLD SIZE
3
TEAM
RECYCLE

Mikey works remotely in a suburban household of 3 adults and 2 dogs. His approach represented a business-as-usual mindset, however he could not use his mainstream recycling infrastructure (such as curbside bins). If Mikey did use mainstream recycling infrastructure, it would count towards the waste total (even if it wasn't true "waste"). So if Team Recycle managed to divert 100% of the material from home without infrastructure, the total amount of waste was zero.

Evan and Mikey collected all of their waste during the challenge, keeping record by weighing the waste at the end of each day using a digital scale. The data was categorized by the following material types (in kg) and examples:

Corrugated Cardboard	Amazon boxes
Kraft Cardboard	Cereal Boxes
Paper	Letter
Glass	Colored Bottles
Plastic	Rigid Meat Trays, Bottles
Composite	Tetra Pak
Organics	Vegetables
Other	General Waste
Metal	Aluminum Cans
Soft Plastics	Grocery Bags

Other metrics that were tracked during the challenge included:

Convenience
On a scale of 1 to 5 (1 = convenient, 5 = not convenient), the participant provided a data point on how convenient it was to adopt the tested behavior.

Financial Obligations
Each day the cost to adopt the new behavior was factored in using bank statements and receipts. The cost has been calculated through calculating the amount spent on the new behavior, and what the 'typical' purchase would have been, had the challenge not been a consideration.

Subjective quantitative data has margins of error due to external factors that influence the data entry decision of the participant. To remain objective, the data points were recorded at the end of the day, several hours since the waste disposal had occurred. This was to provide a neutral emotion at the time of recording to not influence the results

You may note that we refrain from calling “waste” a commodity. This is to keep the report simple. Most people still call it trash, waste, recycling, compost, or rubbish. We know these are all technically commodities, but we like to stick to the expression:

> **One person’s trash is another person’s treasure.**

As a recently certified B-Corp, we aim to continue delivering on our mission to educate and empower a global community towards a circular future. This report is the embodiment of that. The information and insights provided herein are the result of firsthand experience, and out of the “bin” thinking to come up with how we can create a waste-free world.

KEY TAKEAWAYS

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The learnings from this experiment have been distilled into five key takeaways:

PREVENTION IS ABSOLUTELY NECESSARY

Neither recycling or reducing our waste can achieve zero waste alone, but both are required for society to achieve a circular economy. That said, prevention must lead, as current consumption rates are far too high to ever reasonably achieve circularity. This is confirmed by recent reports, where we have consumed more materials in the last 6 years than the whole of the 20th century [1]. Based on our research, prevention is 4x more effective than recycling.

TIME IS THE MOST IMPORTANT FACTOR IN CONSUMER BEHAVIOR

We discovered that time and convenience are the most important factors when it comes to zero-waste. In developed countries, where waste infrastructure is most common, the act of sorting waste, going to the redemption center, or carrying out zero-waste activities needs to be quicker than the current model. Financial incentives do not work as well, as the incentives are usually too small to deem them 'worthy of their time'. So the barrier of convenience needs to be overcome - which is where proactive individuals and policymakers can truly move the needle.

PREVENTION IS LEARNABLE AND SUSTAINABLE

Sustainable behaviors are an iterative process. Drawing parallels between zero-waste living and your fitness goals is a good way to contextualize the behaviors necessary to reduce your waste footprint. Everyone has a different 'ideal', and there is no one-size-fits-all. That said, over time, getting familiar with best practices and incrementally improving week by week is the most effective way to change consumer behavior. Our research has shown that this practice can reduce waste by 40% in a month, by simple monitoring and optimization.

INFRASTRUCTURE DETERMINES WHAT'S POSSIBLE

Developed countries have the ability to handle large volumes of waste. Without the infrastructure, there is little that societies can do to reduce their waste footprint and turn discarded materials into useful products again. Resilient waste infrastructure is required to maintain circular economy practices. Without it, the realization of the value of waste will constantly be overlooked. We found that reduced consumption from citizens will alleviate some of the burden on existing infrastructure, releasing capacity and therefore cost to the end user of these services.

WASTE REDUCTION HAS MULTIPLE CO-BENEFITS

Our research showed that a low-waste lifestyle can reduce consumption by over 90%. It also prioritizes higher-quality materials that have a higher resale value on the secondary materials market, offering a wider benefit for local industry. On top of this, less waste produced means reduced collection frequencies, resulting in lower transport emissions.

CHALLENGE FACTSHEET: TEAM REDUCE

TOTAL WASTE GENERATED
6.85 KG

RECYCLABILITY OF WASTE
92.26%

AMOUNT OF FOOD WASTE GENERATED BY WEIGHT
0.981 KG

MOST POPULAR WASTE ITEM
SOFT PLASTIC PACKETS

LARGEST WASTE STREAM
GLASS - 47.35%

SMALLEST WASTE STREAM
GENERAL WASTE - 0.084 KG

CHALLENGE FACTSHEET: TEAM RECYCLE

TOTAL WASTE GENERATED
20.59 KG

MOST POPULAR MATERIAL
ORGANICS

TOTAL MATERIAL RECYCLED W/INFRASTRUCTURE
17.60 KG

MOST POPULAR WASTE ITEM
PAPER TOWELS

TOTAL MATERIAL RECYCLED INDEPENDENTLY
49.13 KG

MOST FUN TO RECYCLE
GLASS

OVERALL DIVERSION RATE
76.43%

HARDEST TO RECYCLE
PLASTIC

Scrapp

DATA ANALYSIS

DATA ANALYSIS

The data from the challenge has been incredibly insightful in understanding how individual people can meaningfully reduce their waste footprint. This section is going to break up the data behind the challenge, to uncover insights that will answer the question: “Can we reduce, or recycle, our way out of the waste crisis?"

This analysis section has been broken down into seven core themes. We will use the data from the challenge to explore these themes and discuss the key areas that are truly going to move the needle in how we, as individuals, will reduce our waste impact.

OVERALL WASTE GENERATION

Prioritizing waste reduction had a significant impact on Team Reduce’s waste output. While factors such as location and lifestyle differ in European and American citizens, the notion of rejecting waste influenced behavior significantly, negating the varying consumption habits between cultures.

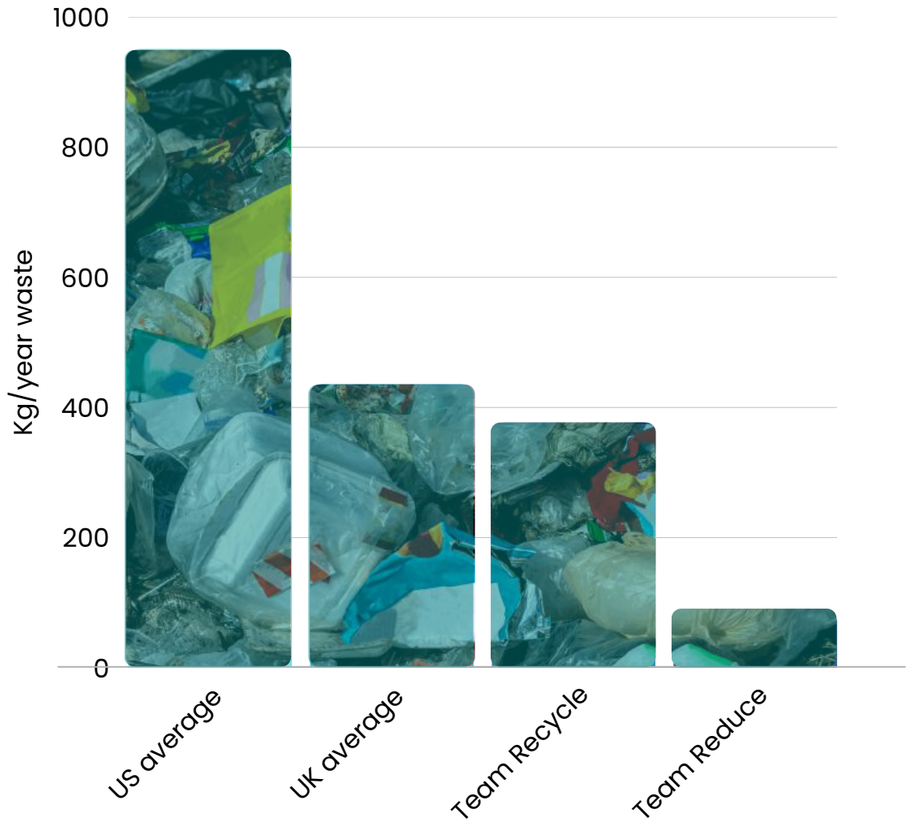
19.2%

Waste created per year (in kg), by Team Reduce

80.8%

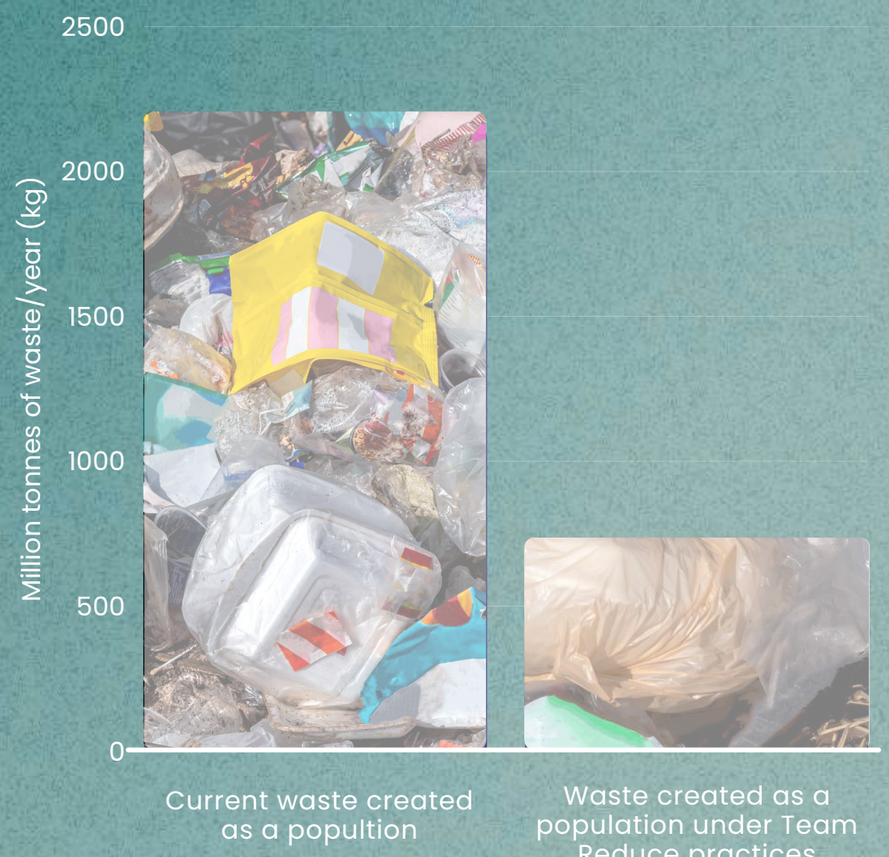
Waste created per year (in kg) by Team Recycle

Scaling the results from a month to a year, Team Reduce would produce 90 kg of waste per year (19% of the UK average [2]), whereas Team Recycle would produce 347 kg per year (43% of the USA average [3]). It demonstrates that prevention measures for waste reduction outperform recycling by 3.85x.



What is noticeable in both approaches is that both teams produce well below their respective national averages. This suggests that active monitoring and measurement of waste influences the behavior of consumption. It can be attributed that ‘conscious consumption’ has a 50-80% reduction in individual waste footprints. In the same way that counting calories (macros) influences your fitness journey, simply counting waste influences the overall production of an individual’s waste.

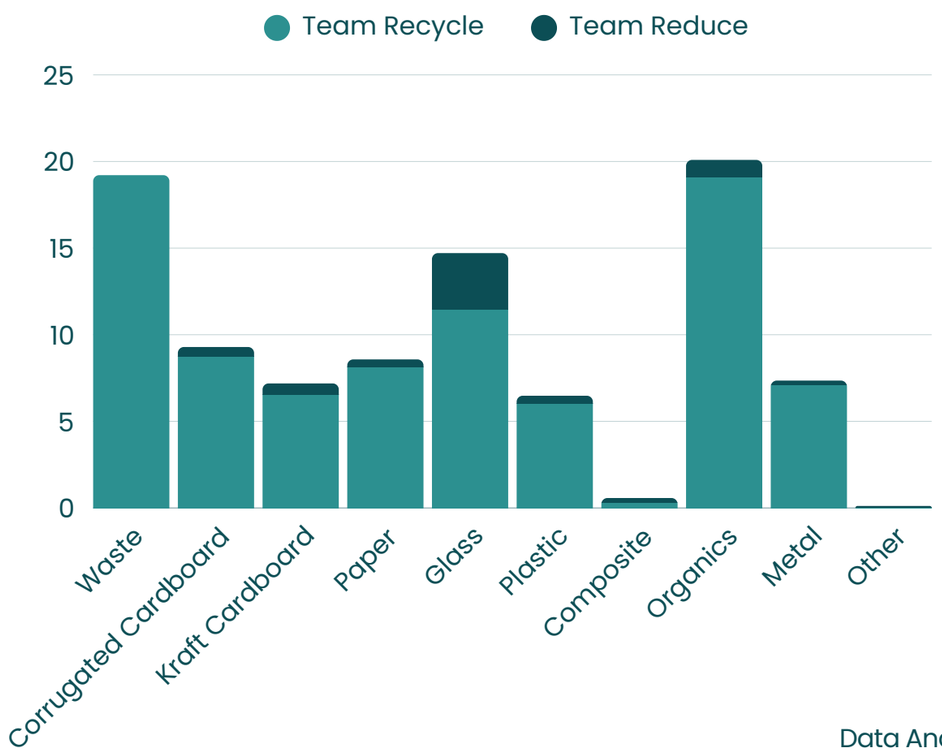
The challenge was carried out in countries with robust waste infrastructure and developed consumer markets. Not all countries have this luxury, but for the purposes of this exercise, let us assume they do. The data shows that prevention would have a dramatically lower global waste burden than recycling alone. In fact, if everyone adopted the practices of Team Reduce (8.2 billion people worldwide), we would produce 735 million tons of waste per year - almost a third of the current global municipal waste generation rates [4]. Recycling alone assumes a ‘status quo’ in consumers that even a developed country’s infrastructure cannot keep up with. In Europe, recycling facilities are closing at an unprecedented rate [5] because there is little appetite for the recycled materials being produced - the main reason being that they are being undercut by cheaper virgin material producers from other regions of the world.



WASTE COMPOSITION

Across all material groups that were tracked during the challenge, it became clear that Team Recycle’s consumption was much larger than Team Reduce's. With Team Reduce cutting back on online orders due to travel, corrugated cardboard consumption was less than 8% of their footprint. They also prioritized reusable beverage containers where possible, resulting in an almost 10x reduction. A significant portion of Team Recycle's metal was through aluminum beverage cans.

Glass accounted for half of Team Reduce's waste footprint by weight, despite representing only a small part of their consumption. The highest leverage opportunity to reduce the impact of one's waste footprint is through reusable glass schemes. Heavier-weight materials usually have a higher associated emissions profile, as they take more energy to transport. However, if materials like glass are not discarded (or even recycled, which takes a lot of energy to melt and remold), the waste footprint is negligible, and the material can be reused again and again.



The question becomes, are policymakers overlooking an opportunity with these one-size-fits-all waste policies? The varying consumption habits of a highly globalized market and consumer base should require dynamic waste policies that account for fluctuations in material consumption on a monthly and yearly basis. High impact materials, such as glass, could dramatically reduce the individual's waste footprint without having to change much in consumer behavior or waste infrastructure.

$0.05

Most bottle deposits have remained the same since 1971 in the United States [6]

CONTAINERS & DEPOSIT SCHEMES

Following the theme of glass, this section takes a closer look at the beverage containers consumed by the challenge, and looks at the economic opportunity that deposit return schemes could bring in reducing overall waste consumption.

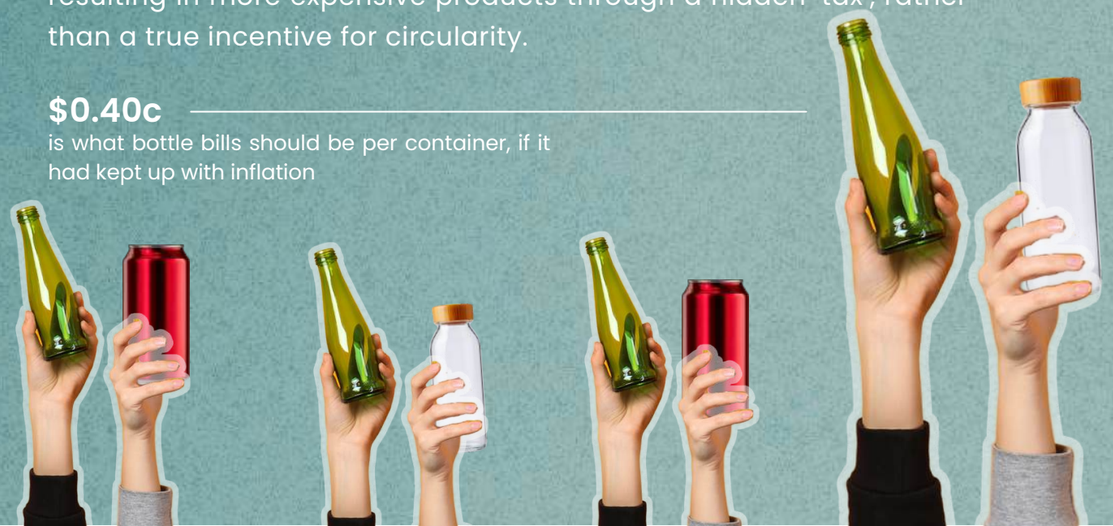
Team Recycle consumed 10x more metal cans than Team Reduce, but both consumed nearly the same amount of glass. Drinking out of aluminum cans is more socially accepted in the United States than in other European countries, which means glass bottles are more readily available at European supermarkets compared to American stores. This influenced the purchasing decisions of the two teams, with Europeans more used to glass material and Americans used to aluminum cans, which ultimately effected their waste footprints.

Glass and metal are inert materials, both infinitely recyclable, and have been used in the packaging industry for centuries. This longevity and durability give them a higher material value. One method of getting these materials out of the waste stream and back into circulation was through deposit return schemes. Putting a monetary value on waste is one mechanism to get materials separated from the waste stream. Since this mechanism was first introduced to the US in 1971, the bottle bill is still only active in 10 states. In the UK, they do not have an active bottle bill (also known as Deposit Return Scheme). Assuming Team Reduce engages with the scheduled UK DRS scheme in 2027, it could reduce their waste footprint by roughly 50%, and in the process, they would make an additional £21.20 per year (on top of the £49.54 from aluminum cans).

For both teams, deposit schemes could have a meaningful impact on waste reduction in the glass and metals category. While the impact varies, at least a quarter of the waste generated by the challenge could be returned to circulation through a deposit return scheme.

We carried out an analysis to understand if bottle bills kept up with inflation, how much should the bottle bill be worth [7]. It should be $0.40c per container. That is 4x - 8x more than what is currently being paid back to consumers. The feedback through our private research is that the redemption value is too low for middle-class citizens (the largest consumers of these containers) for them to engage. This impacts their willingness to adopt the scheme, resulting in more expensive products through a hidden ‘tax’, rather than a true incentive for circularity.

$0.40c
is what bottle bills should be per container, if it had kept up with inflation



FOOD WASTE & EMISSIONS

Food waste is the most impactful waste stream for consumers looking to reduce their environmental impact. Across three square meals a day, it has the highest likelihood of all waste streams being produced. The challenge made both teams really think about their waste generation, even though they maintained food waste levels well below the national averages.

Food waste is the source of 8-10% of all global greenhouse gas emissions [8]. This close monitoring helped reduce any food waste, as it can only be handled if you have your own home composting system (which only Team Recycle did) or food waste collection program from their waste service provider. This meant further scrutiny had to be applied to the consumer behavior, using the challenge as a way to minimize personal food waste through appropriate meal sizing, storing of leftovers, and donating food where possible.

Team Recycle produced 6.5x more food waste than Team Reduce. Some of the common food waste items were fruit rinds, coffee grounds, and vegetable scraps. Simply optimizing for no food waste is considerably more efficient in emissions reduction than composting. It is the main waste stream where we can make a significant impact in emissions reduction.

Assuming the world lived like Team Reduce, we would save 95% (3.07B tCO2e [9]) of food waste emissions. If we all lived like Team Recycle, we would save 65% (1.7B tCO2e) of food waste emissions. Substantial savings for very little lifestyle change. The way emissions are generated through food waste can be reduced significantly through the infrastructure available. The natural decomposition process of food waste releases greenhouse gases, and how these gases are handled influences the impact on the planet. If commercial composting infrastructure were available for both teams, emissions could be reduced by 60-85% relative to a home compost pile and landfilling. Realistically, that would require huge capital investment that many jurisdictions do not have. So lifestyle changes and simple food waste-prevention methods at the consumer level can have as much, if not more, impact without the significant capital investment.

From a financial perspective, if everyone in the world lived like Team Reduce, the global economy would save between $447 billion and $817 billion per year in food waste costs, depending on whether we scale from UK averages or current global totals. That's roughly 45-82% of the current $1 trillion annual cost, equivalent to the GDP of Switzerland or Turkey [9].

TEMPORAL PATTERNS & BEHAVIORAL INSIGHTS

An important factor in consumer behavior around waste is that it is not purely habitual, but also event-driven. Team Reduce travelled a lot during the challenge to attend events around the UK. Without time to plan, they were left with picking up meals on the go, which produced waste. You could argue it was ‘unnecessary waste’. That said, it delivered food to ensure they could eat that evening - so it could be argued that it is necessary waste to get their basic needs met. Team Recycle hosted a brunch on the last day. The event required more packaged goods, a significant amount of glass bottles, and disposable containers such as aluminum trays. Luckily, no plastic plates were used - they were replaced with paper plates whenever ceramic dishware had run out. This strategy was more favorable because that was what was needed on the day at “peak demand”, instead of buying more reusable plates that wouldn’t be used that often.

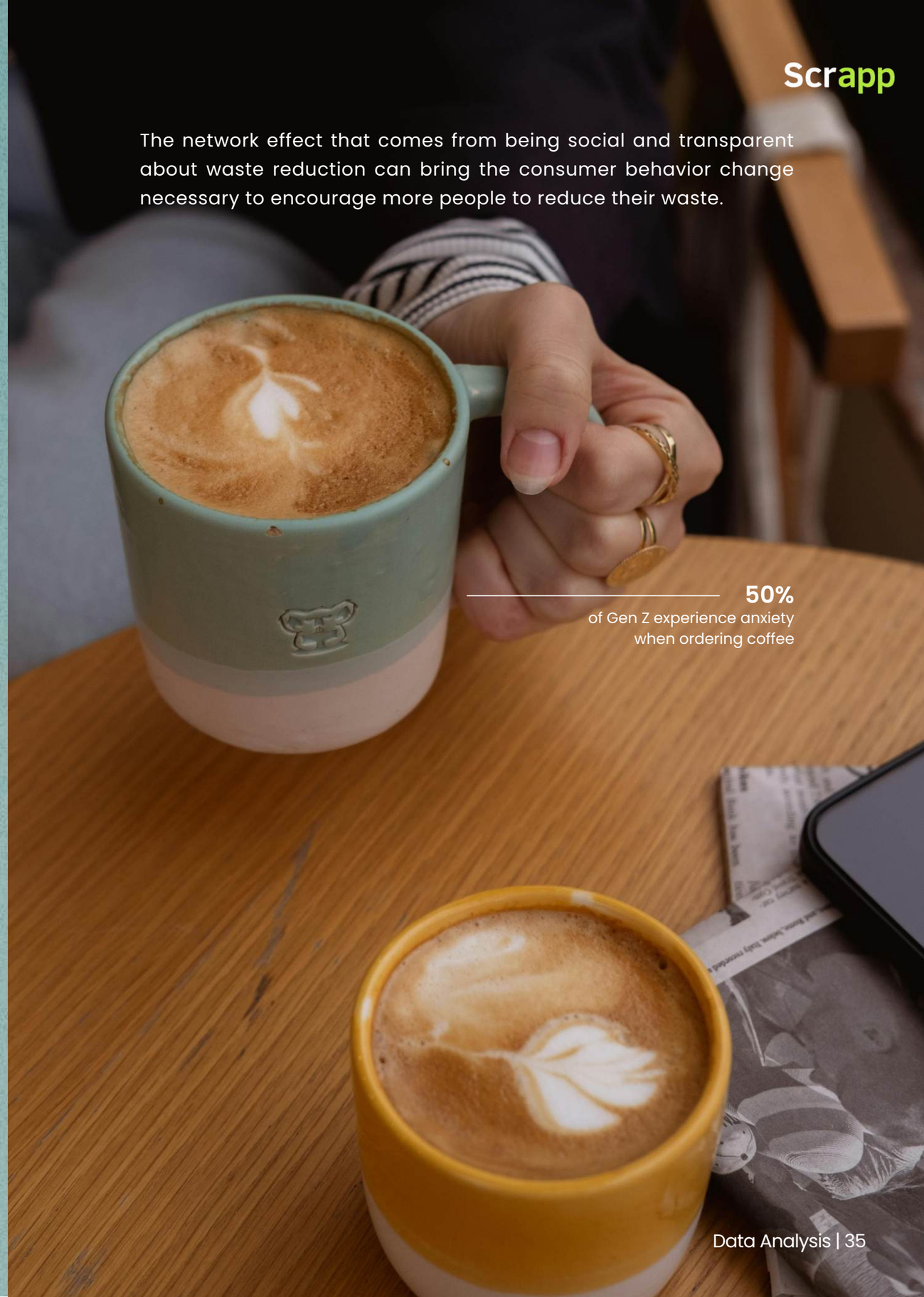
What this tells us is that social events were a bigger driver than daily routine. In fact, once Team Reduce had created a daily routine and optimized his lifestyle for lower waste, his waste generation reduced 40% over the duration of the challenge. Monitoring waste reframed every decision they made about purchasing goods and the impact it had. Like a fitness journey, reducing waste gets easier with time. The mindset changes, so you build a life that factors in that new behavior. Even following the challenge, Team Reduce now carries a reusable water bottle, reusable coffee cup and reusable tray in their bag at all times. It is a learned behavior that requires very little additional thinking.

When compared with recycling, the status quo is very reactionary when it comes to waste. Social activities, convenience, and comfort drive single-use purchasing decisions because that is what we are trained to do as consumers. When the consumer mindset is positioned as 'prevention-first', you optimize your lifestyle for that fact, so you are less thrown off by the conveniences and allure that single-use consumption brings. Team Recycle's waste consumption rose by 10% over the challenge, which coincided with their personal life and schedule.

Unsurprisingly, weekends accounted for a larger share of waste for both teams. More social events, eating out, and detachment from routine led to more waste generated by both participants, with Team Reduce seeing a 73% increase. It highlights a core part of any waste program: waste reflects behavior.

Waste reduction is a skill that is expressed through consistent habits. A skill when practiced enough becomes a natural response. This makes waste reduction a unique sustainable practice, because it can become second nature in your day-to-day living across a variety of lifestyles and activities. Learned behavior can be changed especially when the change in your environment is very small or easily adoptable. As Team Reduce saw during the challenge, their waste generation dropped 40% over the course of the challenge, without any change to their overall lifestyle outcomes (demonstrated through an average convenience score of 1.75, compared to Team Recycle's 3.78). It became new behavior without any "downsides".

During the challenge, Team Reduce had to go out of their way to ask retailers if they can use reusable utensils instead. Everyone said yes - with some retailers actively encouraging it. However, recent research found that half of Gen Z get anxiety ordering at a coffee shop [10], so asking to use the reusable option may be a larger behavioral barrier than first expected due to 'Baristaphobia'. The challenge sparked conversations with company partners and peers alike, which encouraged them to think about their waste and think about asking about reusable alternatives.



FINANCIAL ANALYSIS

One of the most common questions about zero-waste living is the increased cost to consumers. Bulk-buying foods, eating out more, and zero-waste shops are all perceived as more expensive options. This section breaks down the actual cost of the challenge for both participants.

ITEM	COST	COST SAVING DURING 28-DAY CHALLENGE	COST SAVING OVER ONE YEAR
REUSABLE COFFEE CUP	£9 ($12)	£8 ($11)	£104 ($139)
REUSUABLE FOOD CONTAINER	£20 ($25)	£120 ($254)	£2,470 ($3,296)
REUSABLE WATER BOTTLE	£12 ($15)	£60 ($80)	£780 ($1,041)
REUSABLE SHAMPOO	£8 ($11)	-£5.50 (-$7.34)	£14 ($18.70)
OLIVE OIL SOAP BARS	£2 ($3)	£2.84 ($3.79)	£34 ($45)

Additional purchases for Team Recycle:

ITEM	COST
Countertop compost bin	$25
5x Plastic storage bins	$60

As the data shows, implementing zero-waste practices can require an initial investment but leads to long term savings. One swap that was particularly cost saving was using a reusable water bottle. For a small behavioral shift, it resulted in a cost saving of $80 and a better water drinking experience throughout the challenge. The largest cost saving was via a reusable food container. By being able to save food on the go and skip single use takeaway packaging, this led to the largest cost saving during the challenge of $254. What went into these cost savings was largely avoided food purchasing costs by being able to pack meals, and discounts at shops for using our own reusable packaging. The only reusable option that didn't have a return on investment during the challenge was reusable shampoo. This had a longer payout time and would only be net positive over the course of the entire year. With this in mind, as brands design reusable packaging programs, they need to be aware of customers that are price sensitive and offer flexible pricing options that allow for cost parity next to their single use counterparts wherever possible.

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TEAM REDUCE

WAS IT CONVENIENT?

It was surprisingly more convenient to go zero-waste than I initially thought. What started off as a steep learning curve at the beginning of the challenge, over time, I was able to optimize my lifestyle for zero-waste living.

That included carrying my reusable water bottle, my reusable cup, and reusable trays everywhere that I went. I made sure that I asked baristas or servers whether I could use these utensils to help me with my day-to-day coffees or food orders. Because I was traveling a lot, it was surprisingly convenient as I was eating out a lot anyway.

That said, even when I was at home, I was able to really think about the waste I was producing on a daily basis and I was able to fit it into my routine. So there's pros and cons to each side, but I would say overall it was a lot more convenient than I thought.

Going zero-waste on-the-move

Supporting local restaurants

WHAT IS MORE EXPENSIVE THAN SHOPPING FOR SINGLE-USE MATERIALS?

Purchase habits are the easiest way to achieve a zero-waste lifestyle. Controlling the inputs means controlling the outputs. Whether you purchase items in bulk, or products with less packaging is up to you. Of all the options I explored, the cost for specific zero-waste products (eg. refillable shampoo bottles), were more expensive than bulk-purchases over time.

If you are consuming goods that do not have unnecessary packaging, in some cases you end up spending less. Think of soap bars - I got 5 for £2 (~$3). They will last me a year.

For typical laundry detergent bottles you can pay up to £10 (~$13) and it lasts a few months. Whereas there are alternative zero-waste detergent products that are more innovative - such as detergent sheets that only LDPE pouches and 80% lighter than the typical HDPE bottles - that last longer as they have more washes available in them.

When you look at things like clothing, and you're going to thrift stores, you can easily pick up good deals. You can get clothing that is going to last you a long time and minimize your waste that way. Similarly, some coffee shops and cafes that I ordered from had incentives such as 40p (~50c) off your order, if you were able to bring a reusable cup. Overall the cost was much smaller than I anticipated, as the common misconception is zero-waste products are inherently more expensive. Instead, the price-to-value ratio is usually higher where the initial investment is a little more.

IS REDUCING WASTE TIME-CONSUMING?

Overall, reducing waste can be time-consuming, depending on the activity. For example, in one of the videos, I made chicken broth from a whole chicken carcass with vegetables I had to eat, which took me two-to-three hours in an afternoon. Very difficult to justify for people who have busy lifestyles who might not necessarily have time on the weekend.

Preventing waste usually lowers your consumption, so I would save time going to the bin and sorting packaging. And in many cases, I would be bulk prepping my food. So while my initial time commitment would go up, I wouldn't have to cook for the days after because it was already made. So there was an element of short-term sacrifice, long-term gain when it came to my time and my scheduling around going zero-waste.

Overall it is a myth that it is too time-consuming. It was not any difference on my typical day-to-day living. And in fact, it helped me budget for the week by having to think about the waste I was producing because I could optimize for my purchases ahead of time.

Making the most of food waste

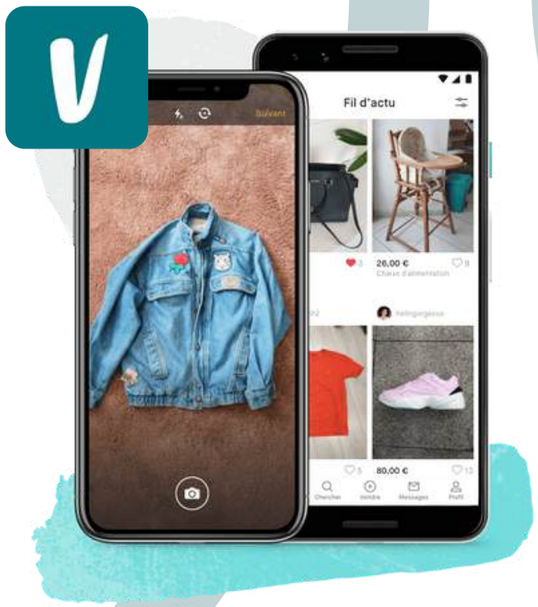
Using homegrown food with no packaging

CAN WE REDUCE OUR WAY OUT OF THE WASTE CRISIS?

I'm a firm believer that we can reduce our way out of the waste crisis. Most developed countries have the highest waste footprint per person, and that is a symptom of a consumerist society. If we are able to reframe the mindset from consumerism, we can make meaningful progress on waste reduction.

Countries like France are already able to do it, where secondhand stores like Vinted are outperforming brick and mortar retailers as consumer marketplaces [11]. We've been trained for years to consume more and more, always wanting the newest thing. But if you can switch that desire off internally, and realize that whatever happiness you're trying to find can not be bought, then you can remove the first barrier to zero-waste living.

For essential items that can’t be made naturally, there are more efficient ways of transporting them as goods, which reduces the associated waste. 91% of oat milk is water [12]. Powdered oat milk is reducing the need to transport water in cartons, offering a mono-material plastic pouch 10x lighter to transport. Similarly, I now use laundry sheets because they have a lower waste footprint. You're not transporting water, you're just transporting a sheet which is 100% of the consumable product.



WHAT WAS THE BIGGEST LEARNING FOR YOU FROM THE CHALLENGE?

The biggest learning I found from the challenge is how much waste has been an afterthought in my whole life, even as somebody who started a company dedicate to reducing waste. I was not perfect when it came to my consumption habits, and this challenge really put a spotlight on my behavior.

This challenge showed me I can do a lot better. Everyone can do a lot better, but waste is a byproduct of our day-to-day living. You can control your outputs by optimizing your inputs. You will end up living a life that doesn't just feel good because you're minimizing your impact, but it makes you really prioritize the things that matter.

YOUNG PEOPLE KEEP SAYING, "WHAT DOES THIS ONE PLASTIC BOTTLE REALLY DO?" - ARE THEY RIGHT?

There is an allure for young people to question the impact that a single consumer action will have on the planet, and to some degree, they're right. Ultimately this waste crisis isn't the consumer's fault. It is the result of corporations relying on a consumerist society of people buying more, consuming more, and therefore wasting more.

One of the most overwhelming responses I received during this challenge was that people were interested to learn how I'm doing it. They wanted to understand whether it's something they can adopt. More often than not, it got a conversation going that they normally wouldn't have had before.

Just the fact that I now carry my reusable water bottle, my reusable cup, and my reusable tupperware with me as a result of this challenge, gets me talking to other people who see me with them, and they think if he can do it, I can probably do it too.

So I wouldn't necessarily say young people are right. Every individual action compounds. One thing that we must consider is if you cannot contextualize the impact and you cannot show what the impact that one plastic bottle is having, you're never going to get the accountability or transparency that is needed to get people to buy into the system.

IS A ZERO-WASTE LIFESTYLE ACTUALLY POSSIBLE?

I would say a zero-waste lifestyle is possible. I am biased. I do not have the responsibilities of children or a dog. I live in an urban area where I have a good recycling infrastructure with me. But I would say overall it is close to being attained for the average person. Progress towards the goal beats the perfection of it.

WHAT TIPS DO YOU HAVE FOR SOMEONE LOOKING TO GO ZERO-WASTE?

If you're looking to go zero-waste, I think the best place to start is with food waste. It is the heavy hitter of the average person's waste stream. This challenge showed that a reduction in food waste is possible through proper planning. I had to find creative ways to reduce food waste. One way was through cooking a full chicken and boiling the leftover carcass with vegetables to create a broth that was reused for 6 more meals.

As coined by James Clear (Author of Atomic Habits), aim for marginal improvements every day. Don't let one bad day throw off your week. Stack your habits. Make sure your reusable water bottle is by the front door as you leave the house, your Tupperware is on the kitchen counter the night before, and your reusable coffee cup is by the machine or in your bag ready to go. Simple nudges that bring waste to the front of your mind distill the mindset of minimizing your impact.

DAY 1 Monday	**DAY 2** Tuesday	**DAY 3** Wednesday	**DAY 4** Thursday	**DAY 5** Friday	**DAY 6** Saturday	**DAY 7** Sunday
DAY 8 Monday	**DAY 9** Tuesday	**DAY 10** Wednesday	**DAY 11** Thursday	**DAY 12** Friday	**DAY 13** Saturday	**DAY 14** Sunday
DAY 15 Monday	**DAY 16** Tuesday	**DAY 17** Wednesday	**DAY 18** Thursday	**DAY 19** Friday	**DAY 20** Saturday	**DAY 21** Sunday
DAY 22 Monday	**DAY 23** Tuesday	**DAY 24** Wednesday	**DAY 25** Thursday	**DAY 26** Friday	**DAY 27** Saturday	**DAY 28** Sunday

AVERAGE CONVENIENCE SCORE 1.75

Scrapp

TEAM RECYCLE

CURBSIDE IS CONVENIENT, BUT TOO CONVENIENT. WHAT IS THE RIGHT AMOUNT OF EFFORT TO TEACH RECYCLING CORRECTLY?

So in my community, contamination is really high, and there are some underlying reasons for that besides a lack of enforcement. Burlington had multi-stream recycling before single-stream, so a lot of residents had an understanding of the need to sort their recycling, myself included. I can still smell the week-old cat food cans from the kitchen recycling bin to this day. That being said, once the town switched to single stream, contamination started to climb, as people chucked anything that resembled plastic or metal. We are talking umbrellas, kids' toys, and play sets, even a bicycle frame at one point. When we call something single-stream recycling, it means people think anything “recyclable” can go in the bin, which is a reasonable guess based on the way it was marketed. We created an “away” without any afterthought, and the recycling knowledge went away with it.

This reminds me of a story from Rory Sutherland when the first cake mix was invented. A lot of people at the time felt that just adding water was tacky when bringing something over to someone's home. They felt “guilty” as the gesture felt hollow. Cake mixes weren’t selling, so companies had to come up with something fast. Through some user studies, they found that removing the powdered egg from the mix and requiring the user to add oil, water, and the egg was enough to make people feel like they “made” the cake. From that point forward, the use of cake mixes became more widespread, and today it's commonplace. Recycling needs to find that balance, where recycling is just as convenient as throwing something away, and there is no real incentive to learn the difference. Coupled with complicated lists and guidance while someone has literal trash in their hands, it's no wonder we end up with sky-high contamination rates, and people have checked out.

With the rise of organic recycling and diversion mandates, I think the right call is a multi-stream system. Whether that is with Deposit Return Programs coupled with curbside collection, or multiple streams at the curb, I think propagating the myth of single-stream recycling will only lead to ruin. Until I can throw a propane tank and a battery in my curbside bin, don’t call it zero-sort or single-stream.

WHAT WAS ONE INSIGHT YOU DIDN'T SEE COMING IN THIS EXPERIENCE?

I grossly overestimated how much material I produced and how much I could divert. Going into this challenge, I thought I had a secret advantage by having a robust home composting system at my house and the ability to break down glass. That being said, what I didn't realize was how much plastic and metal dominated the waste I produce. I grew up in manufacturing, so I had other ways to recycle metal without infrastructure. Still, I didn't want to subject materials to anything that wasn't their highest and best use, which, for plastic and metal, I was largely S.O.L.

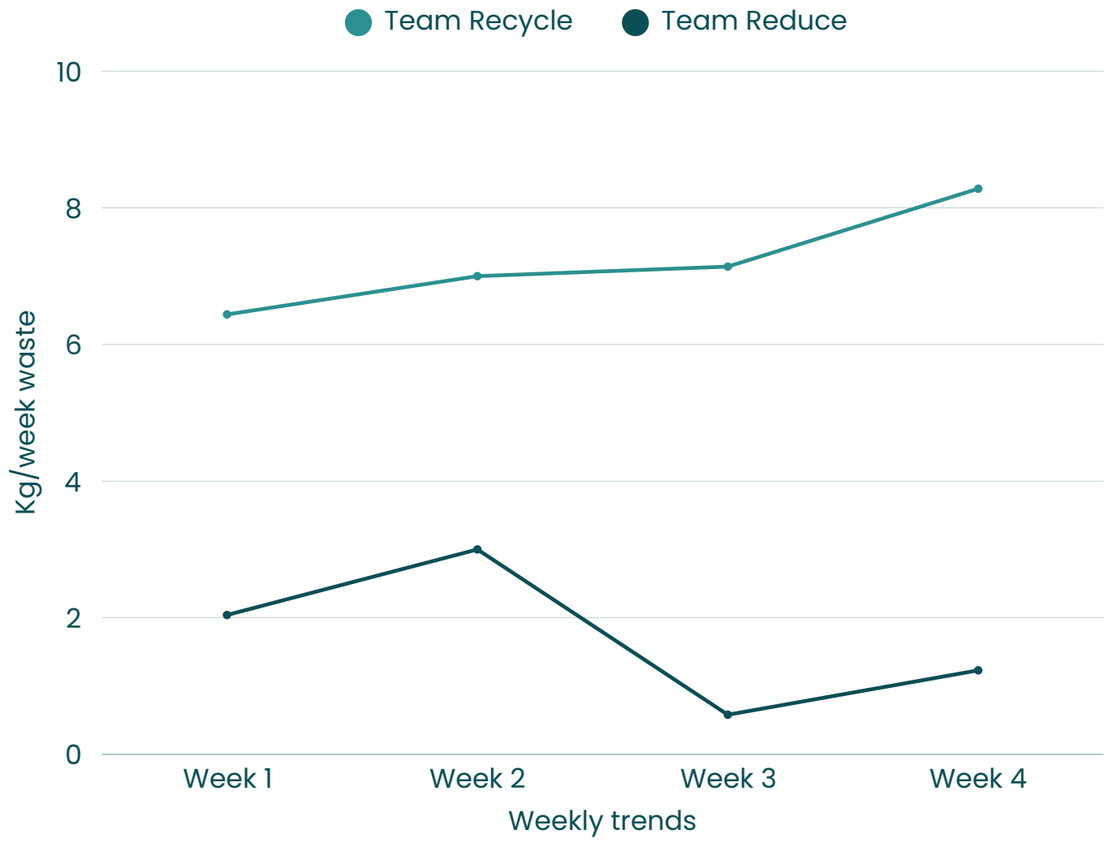
We have a saying at Scrapp to identify the key problem in a study that explains their reason why:

> **What is the screaming child in the backseat of the car on the way to work?**

This month, I indeed identified mine as two stray dogs and 2 am sprints to open the back door in time so they could get outside.

In terms of a literal wild card, right after we planned this project, my family ended up adopting two shelter dogs that were former strays, which led to some accidents in the house. That month, we went through about twelve rolls of paper towels, which weigh around 0.68 kg each. A lot of these ended up in the trash because the dogs were on hookworm and other parasite protocols, so I couldn't risk the health repercussions. They were also both critically underweight, so they added quite a bit to the packaging tally with tin cans for wet food and metalized plastic bags for dog food.

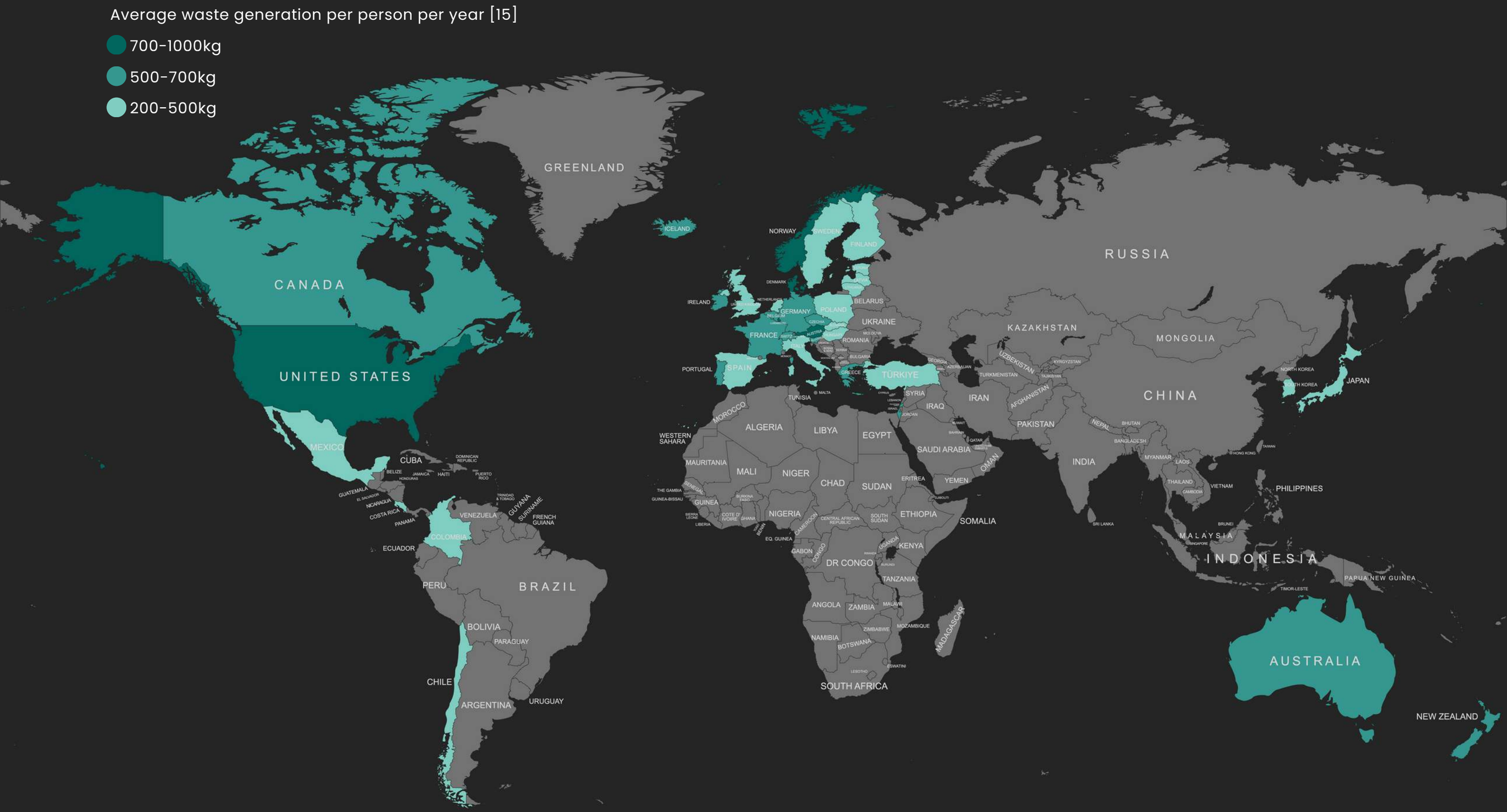
Average weekly trends of waste generation (Kg) between Team Recycle and Team Reduce



WHAT IS THE BALANCE OF THINKING LOCALLY BUT ACTING GLOBALLY FROM THE LENS OF RECYCLING?

During my undergraduate degree at UNH, we had a saying of “think local and act global.” The subtext of this is that our problems may be global, but every solution is unique at the local level. Recycling is a prime example of this. A recycling system that works really well in one community may not translate well to another. Finding the why of your community alongside the means to enable that “why” is a unique journey.

For example, Burlington averages a contamination rate of over 20% and a recycle rate of around 37%. We have a small population of 26,377 people, and most households are dual-income, with a median household income of $142,207 and a mean of $171,061 [14]. Burlington also has over 150 restaurants and a large shopping mall, so its safe to say it represents the pinnacle of convenient consumerist culture, with Amazon offering same-day delivery routinely to the area. If we were to design a system that relied on a homemaker, it would probably struggle. People are strapped for time, and groceries get more expensive by the day. Even bottle deposits have become less effective over time due to a myriad of factors, like a nickel just not being worth much these days, alongside people opting for more convenient food shopping options like Instacart or Uber Eats. The largest mode of engagement with bottle programs these days is homeless people and charity groups like the Boy Scouts, being a large portion of redeemers. In Burlington, due to the demographics, recycling is essentially a feel-good exercise to make us feel a little less bad about the amount we consume. I often hear people say, “Hey, I care about the planet, I recycle,” when they hear about my line of work. It’s moments like this that get tough, when cleaning up after yourself becomes something to be celebrated. If we are to make a strong diversion program in Burlington, it would have to have strong altruistic roots, bypassing people's convenience-wired brains and connecting them to something larger than themselves.



created with mapchart.net

WHAT ARE SOME OF THE LIMITS TO RECYCLING ALL OF YOUR OWN MATERIAL?

I think first and foremost, before we get into the physical aspect, we tend to forget the social or emotional aspect of “When life is hard, it's hard to make time for it.” I work on the weekends as a handyman, and after a whole week of Scrapp work and coming home from a 12-hour shift on a Saturday night to a pile of trash to sort with work the next day, you could say there are a lot of other things I would rather be doing. Additionally, understanding what items are made of requires a level of knowledge that isn’t exactly common anymore. For example, Tetra-Paks are multi-layered with numerous materials, aluminum cans have a plastic liner, and flexible plastics can consist of multiple materials, which we can’t even detect without special equipment.

For physical limitations, it comes down to the same pressures we have at scale in the recycling world. At scale, we require quantity, quality, and an end market to sell the material to. In my garage system, I needed enough material at once to make it worth my time to recycle it, clean material that I could easily deconstruct, and a use case for it around the house. If any of these weren’t true, the system couldn’t work. Now, some materials like aluminum, steel, and certain plastics require a certain level of scale to become materially possible. Still, with what we are seeing at scale in the market today, it makes sense that recycled materials can struggle to remain financially viable when virgin material is cheaper. By looking at things this way, I realized that organic diversion had the highest potential to reduce the amount of material going to landfill while maintaining lower costs and lowering greenhouse gas emissions at scale.

The difficulties with modern packaging

Tackling packaging difficulties

WHAT DO YOU THINK WOULD MAKE RECYCLING MORE ENGAGING TO PEOPLE?

Bringing a human element to recycling can make it more engaging. Granted, I am biased as an engineer who works in the space and grew up watching “How It’s Made” documentaries with my dad. The whole reason we did this study is that we felt waste could be a lot more fun and interesting. I think presentations need to incorporate humor and intrigue and relate to the audience they’re presenting to. I know, from an industry perspective, it can be Sisyphean to have to reiterate the same points over and over again when you can see the contamination in the waste stream not getting any better. I think as educators, we have to live for those lightbulb moments when people just get it. I know for me, as an Italian who loves to “bicker”, I am happy having uncomfortable conversations around the imperfections of recycling, and why despite that it is still worth doing.

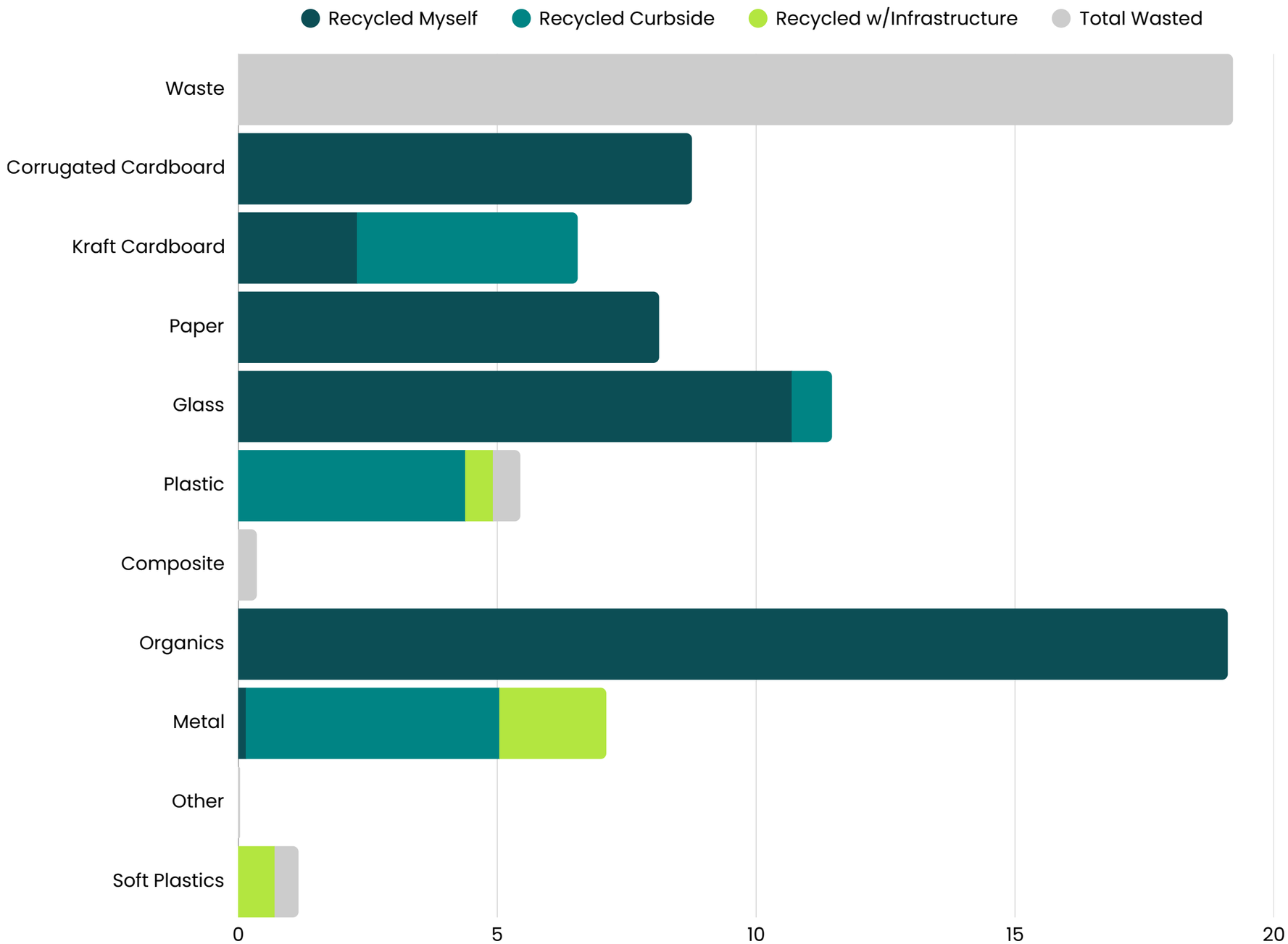
I think the enforced ignorance since China’s National Sword has done far more harm than good. At the end of the day, we live in a world where someone can have their favorite meal delivered to their door in under an hour with at max, five taps on their phone. Expectations from a consumer lens are well beyond what I think we understand, and a 21% recycling rate for packaging isn’t exactly appetizing. This isn’t an entirely fair comparison, but if a plane had that success rate, I don’t think anyone would fly.

Albeit a lot of the recycling system loss occurs from lack of engagement and contamination, with only about 17% on average due to MRF loss and about 35-50% due to access, depending on the area. So every day, people play a role in this failing, post-national sword, but before then, I think the industry set up a false narrative that it’s still paying for.

DAY 1 Monday	**DAY 2** Tuesday	**DAY 3** Wednesday	**DAY 4** Thursday	**DAY 5** Friday	**DAY 6** Saturday	**DAY 7** Sunday
DAY 8 Monday	**DAY 9** Tuesday	**DAY 10** Wednesday	**DAY 11** Thursday	**DAY 12** Friday	**DAY 13** Saturday	**DAY 14** Sunday
DAY 15 Monday	**DAY 16** Tuesday	**DAY 17** Wednesday	**DAY 18** Thursday	**DAY 19** Friday	**DAY 20** Saturday	**DAY 21** Sunday
DAY 22 Monday	**DAY 23** Tuesday	**DAY 24** Wednesday	**DAY 25** Thursday	**DAY 26** Friday	**DAY 27** Saturday	**DAY 28** Sunday

AVERAGE CONVENIENCE SCORE 3.78

TEAM RECYCLE DIVERSION SCORE



Recycling via the curbside bin

Sorting plastics into recyclables & non-recyclables

DISCUSSION

DISCUSSION

With the lessons Team Reduce and Team Recycle learned through this experiment, what core principles can be applied to the broader context? As the zero-waste hierarchy was already discussed in the methodology, we want to use this section to delve deeper into the second and third-order benefits of both recycling, reduction, and reuse.

ORGANICS DIVERSION & REDUCTION

Organics diversion has massive impacts on waste disposal costs and user experience. Whether it is a compost bin or a food donation program, it can make a massive difference in your operations and the community. Organics are often one of the heaviest aspects of the waste stream, alongside glass. By diverting organics, you can keep the trash and recycling clean, enabling second-order logistic benefits such as reduced trash runs, rightsizing bins, decreased disposal costs, minimized odors, improved reputation, and a better customer experience.

Interestingly enough, by visualizing the types of organic waste in the system, places like dining halls and restaurants can see items that were over-procured or options that people simply didn't like. UNH's dining hall would do a food waste diversion audit twice a semester and put the food on display by the dish return. Food waste would go down in the following weeks, but students could always use a reminder or two later in the semester. It is a valuable source of data to lower operating costs and create a cleaner experience for customers and staff alike. This has led to some hospitals and dining areas switching to made-to-order dining, which has reduced food waste by upwards of 60% and for every 1 kg of food waste prevents it saves 2.5kg of CO_2 more than preventing 1 kg of cardboard. Ultimately the purpose of food is to feed people and animals, not the compost pile.

PROCUREMENT OPTIMIZATION

In the waste industry, we measure things backwards. This is a bit of a crude expression, but we like to relate it to the fitness industry, where it's very rare that a doctor or trainer would only measure what's coming out of you, rather than what's going into you. We can only tell so much about a system without looking at the inputs. Once packaging and materials become waste, most of the data is lost. At Scrapp, we are trying to change that outlook. By optimizing procurement systems and predicting what will turn into waste, we can provide significantly more insight and options into what can alleviate waste costs. Furthermore, this allows us to tailor customer experiences and immediately tie them to cost, making sustainable swaps easier to justify. By understanding procurement and the "why" behind purchases, you can gain unique insights to increase customer satisfaction, reduce spend, craft more realistic procurement policies, and ultimately create a unique experience for employees and customers alike. For individuals, it's plain and simple, groceries are too expensive right now to be throwing anything good away, and if we only buy food to forget about it in the back of the fridge, then throw it away, our money can be better spent elsewhere.

SYSTEMS OF REUSE & REPAIR

Reuse is an interesting aspect as solutions have shown to be cost competitive, but require some shifts in a closed loop environment and significant change in an open loop system. In closed-loop systems (eg. a stadium), they have some really unique downstream effects. Looking at a stadium environment, reusable cups can provide unique sponsorship opportunities for vendors, while fans like them because they spill their beer less with a more rigid cup. That's the lightbulb moment sustainability teams want to hear. No matter who you are, no one wants to spill a beer they just spent $14 on (nor does the stadium staff want to clean it up either). It's not just stadiums, reusable or low waste products that rely on a refill model in omni-channel markets can remain sticky with customers and often have way lower shipping costs as the bulk can be handled in the first order, while concentrates or refills in small packaging formats can be sent out after for repeat purchases. This can create a better user experience through a durable design. Some reuse models have stark similarities to repair models that revolve around wearables.

LANDFILL TIPPING FEES ARE ONLY INCREASING

Landfill tipping fees are the fees that haulers have to pay to dispose of waste in a landfill. These fees include operational costs, long-term liability, regulations, compliance, and capital recovery. Broadly speaking, landfill tipping fees follow supply and demand, just as most things do. As we run out of landfill space globally, especially in the Northeast United States, tipping fees will increase relative to the amount of space left. Disposal fees often include the tipping fees plus any processing costs to handle the materials. These vary based on numerous factors such as material type, regulation, and if there are desirable end markets.

With disposal and landfill tipping fees raising the price floor, it opens the pathway for more economical diversion strategies, and we can expect to see a broader uptake with a variety of programs.

BEHAVIORAL CHANGE

Three factors drive change: Fuel, Friction & Inertia. Fuel provides the energy to make the change, Friction is the resistance to the change as it's being implemented, and Inertia is the residual resistance from ingrained behavior—inertia, when it's on your side, can be incredibly powerful. In a world of instant gratification our measures of success have to change, especially with behavior change. Think of the generation who grew up around the great depression; they saved and reused everything, everything had value, down to their drawer stuffed full of grocery bags.

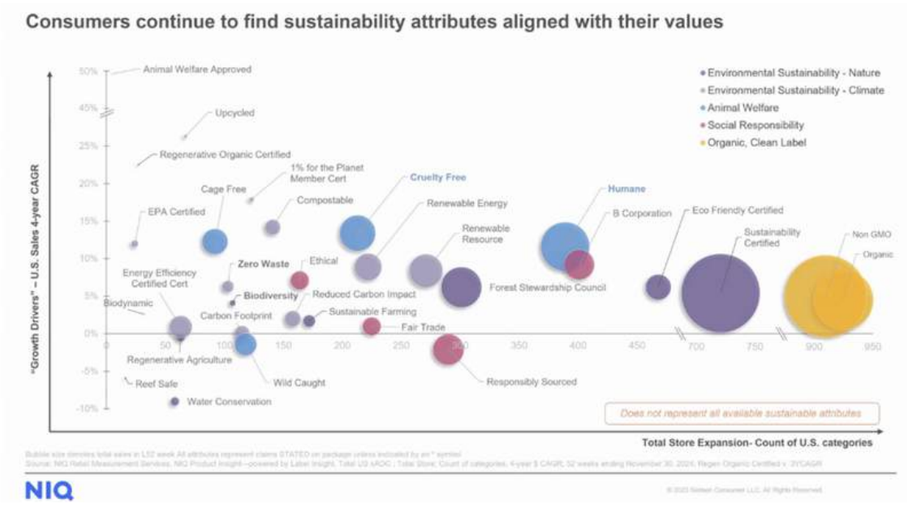
> **We are often too impatient to be intelligent.**

Since the 80s, the Western world has positioned itself as individualist cultures of convenience, leading to a loss of generational knowledge of community stewardship and the skills that make up recycling and reuse. With the rise of social media, attention spans are dwindling to the point where the average attention span is 7 seconds, while real behavioral change takes six to twelve weeks. Education has to adapt to meet these factors.

WE CANNOT CHANGE WHAT WE DO NOT OBSERVE

Without data and consistent measurement, we can't observe the behaviors we need to change. Waste audits have existed for years, but there is only so much that can be done at that granularity. Even tying back to behavioral change, it is so hard to progress when we cannot see the incremental progress we are making. Both teams achieved massive reductions in waste (77.6% for Team Reduce, and 56.3% for Team Recycle through tracking and adaptation). Team Recycle can attest that when confronted with the numbers, it can spur innovation. The micro is just as important as the macro. Some industries even measure their recycling in pounds, not tons, so it's more relatable to the average person.

Brands are capitalizing on zero-waste initiatives with higher sales relative to their wasteful counterparts. This tracks along with other sustainability attributes as shown in the NielsenIQ diagram below, where, through purchase data, not survey data, the value-action gap is being overcome.



POLICY'S ROLE BOTH NEW & OLD

Policy is diverse and can be a massive driver for zero-waste initiatives. Some of the earliest waste policies are still effective today, but in ways that differ from their original intent. Bottle deposits, as discussed earlier, are a prime example of this. The policy still has high return rates today, but the returner demographics have changed from when the policies first passed. Policy is complex and unique for each area, so there are no one-size-fits-all solutions. That being said, all policy should be informed by data, stakeholder groups, and foster principles across the entire zero-waste hierarchy, then repeatedly monitored and validated across numerous metrics from the first to third order.

WHERE DO YOU START

As with anything, zero-waste behavior builds over time. Small changes can build momentum and yield big results. This section will serve as a takeaway list to help people decide on steps that would make the biggest impact in their community, ranging from municipalities to businesses & government agencies.

CONCLUSION

CONCLUSION

THE VERDICT: PREVENTION LEADS, RECYCLING SUPPORTS

This challenge set out to answer a question that practitioners, policymakers, and everyday consumers wrestle with constantly: should we focus on reducing waste or recycling it? After 28 days of meticulous tracking, the data tells a clear story - prevention outperforms recycling by 3.85x. But this isn't an argument against recycling. It's an argument for sequencing.

Prevention must come first. At current global consumption rates, no recycling infrastructure, no matter how sophisticated, can keep pace. We've consumed more materials in the last six years than in the entire 20th century. Recycling was never designed to handle that volume, and expecting it to is setting the system up for failure. But once prevention has done its work, robust recycling infrastructure becomes essential to close the loop on what remains. Neither strategy works in isolation; they work as a system. Team Reduce demonstrated something important - waste reduction is a learnable skill, not an innate trait. Over the course of the challenge, their waste output dropped 40% through nothing more than habit formation and lifestyle optimization. No expensive equipment, no radical life changes. Just incremental improvements, stacked over time. This is the hopeful message: zero-waste living isn't about perfection from day one. It's about getting a little better each week until low-waste choices become automatic.

WHAT THIS MEANS FOR DIFFERENT STAKEHOLDERS

The insights from this challenge translate differently depending on who's reading them.

For individuals and households, the highest-leverage starting point is food waste. It's the most consistent waste stream (three meals a day, every day), carries the heaviest emissions burden (8-10% of global greenhouse gases), and responds well to simple interventions like meal planning, proper storage, and creative cooking. If you do nothing else, start there. Beyond food, the reusable trifecta - water bottle, coffee cup, and food container - can become second nature with minimal effort. Keep them by the door. Make the sustainable choice the default choice.

For businesses and institutions, the lesson is to measure backwards. Most waste programs focus on what's leaving the building. The real insights come from understanding what's coming in. Procurement optimization - knowing what you're buying, why you're buying it, and what it will become - unlocks cost savings, reduces disposal fees, and creates better experiences for all stakeholders. Organics diversion deserves special attention: it keeps other streams cleaner, reduces collection frequency, and moves the needle on less emissions.

For municipalities and policymakers, the data points to some uncomfortable truths. Single-stream recycling, while convenient, has contributed to contamination rates that undermine the entire system. The bottle deposit analysis is particularly striking: adjusted for inflation, deposits should be worth $0.40 per container - eight times the current rate. Middle-class consumers (the largest users of beverage containers) have no meaningful incentive to participate. The redemption value has become a rounding error, not a behavioral driver. Dynamic policies that account for material-specific impacts like prioritizing reusable glass schemes could deliver outsized results without requiring dramatic shifts in consumer behavior.

ACKNOWLEDGING THE BOUNDARIES

We should be clear about what this challenge does and doesn't prove. Two participants in developed countries with established waste infrastructure aren't representative of global conditions nor a statistically significant sample size. The UK and US have collection systems, recycling facilities, and consumer markets that much of the world lacks. The specific percentages and projections in this report assume that infrastructure exists.

That said, the behavioral insights likely translate more broadly than the logistical ones. The finding that tracking influences behavior, that prevention is learnable, that social events drive waste spikes. These waste patterns reflect human psychology, not geography. And the core principle holds everywhere: you cannot recycle your way out of overconsumption. Prevention has to lead the way.

OUR NEXT REPORT: CULTURAL DRIVERS OF ZERO WASTE BEHAVIOR

Why does South Korea recycle 54% of its waste while the United States — with far greater resources — manages just 30%? Why did a remote Japanese town of 1,500 people achieve near-zero waste while major cities struggle to break 20% diversion? The answers aren't found in infrastructure alone.

Our forthcoming report examines the cultural, psychological, and behavioral forces that shape how communities engage with waste. Drawing on decades of research across behavioral economics, cultural psychology, and social norms theory, we explore what actually motivates individuals to act — and what conditions allow those motivations to take hold. The goal isn't to prescribe one-size-fits-all solutions, but to surface patterns that practitioners can test and adapt in their own contexts.

THE PATH FORWARD

There isn't a single diversion method that solves every waste issue. But as a system - with prevention at the top of the hierarchy, reuse and repair in the middle, and recycling as the backstop - real progress becomes possible. The Ellen MacArthur Foundation's finding that 80% of a product's environmental impact is determined at the design stage [16] underscores this point. By the time something becomes waste, most of the damage is already done. The leverage is upstream.

We conducted this study knowing that not everyone will count and store every piece of waste in their home for a month. We're not suggesting they should. What we are suggesting is that measurement matters, that small changes compound, and that the barriers to low-waste living are increasingly lower than most people assume.

The most enduring insight from this challenge might be the simplest one: Team Reduce's waste dropped 40% over the course of a single month, not through sacrifice, but through awareness. They didn't give up the things they enjoyed. They just got better at noticing what they were consuming and making small adjustments along the way. By the end, carrying a reusable bottle and cup felt as natural as grabbing their keys.

Zero-waste isn't a destination. It's a direction. And the data from this challenge suggests that once you start moving in that direction, the momentum builds on itself. Prevention becomes habit. Habit becomes culture, and culture, eventually, becomes policy.

We don't need 100% of people to achieve zero waste. We need everyone, collectively, to reduce or recycle what they can in their current situation. That's how systems change - not through perfection, but through participation.

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