

# reuse wins

**The environmental, economic, and  
business case for transitioning from  
single-use to reuse in food service**

**Executive Summary**

## Executive Summary

**Plastic pollution is growing exponentially, and the U.S. is the largest polluter.** It is estimated that the ocean currently contains 150 million metric tons of plastic, and most of it is packaging. A third of all plastic packaging produced ends up in the environment – approximately 31 million tons annually. Out of that total, 11 million tons enters our oceans each year. That’s the equivalent of 34 pounds of plastic for every foot of coastline in the world. It’s visible on our shores and in our waters, and it’s ecologically devastating.

The COVID-19 pandemic has exacerbated the problem. Consumption of single-use plastics has increased by 250-300 percent since the pandemic began, resulting in a thirty percent increase in waste which is attributed to personal protective equipment (PPE), packaging, and disposable foodware. During the pandemic, online shopping and takeout food orders and delivery increased by 78% in the U.S.

Growing public concern over this crisis has led to some progress, but the problem is still growing. Unless we change course, plastic pollution is expected to triple in the next 20 years.

Most of the plastic in the ocean and littering city streets is food and beverage packaging that originates from restaurants, cafes, and grocery and convenience stores. Without a shift in how we package and consume food and beverages, the situation will get worse.

**But trying to solve the plastic pollution problem by targeting plastics alone misses the point because all single-use products create waste and cause unnecessary harm to the environment and public health. The problem isn’t just plastic, it’s the throw-away culture.**

Eliminating plastic but failing to change the single-use, disposable paradigm results in “regrettable substitutions” that can be just as harmful, if not more so, than plastic. Examples of single-use alternatives to fossil-fuel based plastics that also cause environmental harm include:



**Bio-based plastics** (compostable and non-compostable): made from agricultural products that require significant inputs of energy, water, and fertilizers, can create dead zones in waterways, ozone depletion, ocean acidification, particulate emissions, land use impacts, and toxic exposure. Bio-based plastics also behave exactly like traditional plastics in the environment, never biodegrading and harming wildlife through ingestion and entanglement.



**Aluminum:** known for being highly recyclable, but causes air pollution, land-use exploitation, and significant carbon emissions in the mining, smelting, and production phases. Recycled content aluminum products on average contain 30% or greater virgin aluminum.



**Paper:** three billion trees are logged each year to create paper packaging products. Trees provide a range of environmental benefits, including habitat and biodiversity, soil health, clean air, and removing carbon from the atmosphere.



**Wood:** often bamboo, used as an alternative to plastics utensils, comes from monoculture plantations that rely on forest clear-cutting and use fertilizer, herbicides, pesticides, and intensive management practices that can deplete topsoil, increase erosion, and contaminate water resources.

**Plastic pollution is growing exponentially, and businesses and policymakers are starting to take action. But trying to solve the problem by targeting plastics alone misses the point. The problem isn’t just plastic. It’s our throw-away culture that’s driving plastic pollution and a host of other environmental problems. Solving this requires a paradigm shift from single-use to reuse.**

**In addition, it’s generally accepted that recyclable materials are better environmental choices for packaging.** But with food service packaging, this is not always the case. Research that compared 18 years’ worth of peer-reviewed Life Cycle Assessments (LCAs) found recyclable food serviceware had lower environmental impacts than landfill-bound packaging in only 56% of the comparisons. That’s because many products that are technically recyclable often don’t get recycled, particularly food serviceware that is usually too dirty to be recycled.

Today, recycling struggles to be profitable. U.S. communities – unable to export dirty paper and plastics to China – now face a \$2-4 billion shortfall between the costs of collection and sorting. No longer able to sell materials for recycling, many communities have to pay to have them recycled. U.S. plastics recycling is expected to drop from 8.4% in 2017 to 6.6% in 2020.

The plastics industry has known for decades that the economics of recycling plastic – which is primarily sourced from inexpensive virgin feedstocks – coupled with the technical challenges would make plastic recycling unworkable at scale. The myth of plastics recycling has been perpetuated and sold because, as one industry insider stated, “selling recycling sold plastic.”

**Recycled content is a good thing for products made from the same materials.** Generally, products with more recycled content are better for the environment when compared to products made of the same materials without recycled content, such as a glass bottle with and without recycled content.

**Unfortunately, compared to standard packaging, single-use bio-based plastics and single-use compostable packaging are not always better for the environment either.** Across numerous environmental impact measures – global warming impact, land occupation, eco- and human toxicity and aquatic impacts – compostable food serviceware has greater environmental impact than the alternatives. Compostable packaging often doesn’t end up in compost facilities, either, because it isn’t accepted by commercial composters or because the infrastructure doesn’t exist. Even when it does get composted, the environmental impacts from producing, using, and disposing of compostable products typically outweigh the advantages.

**The bottom line is that we can’t recycle or compost our way to a sustainable future. We have to work upstream to redesign the systems that generate all the waste in the first place.**

Finding One:

**Reusable food serviceware beats single-use alternatives by every environmental measure.**

LCAs reviewed for this report show that reusable food serviceware achieves environmental benefits over the disposables they replace. For cups, it's between two and 122 uses, for plates and clamshells, it's between three and 50 uses, and for utensils, only two uses of a reusable are required. Since most reusable products last upward of 200 uses – and generally with steel, glass, and ceramic over 1,000 uses – reusables out-perform disposables on every metric, and the benefits to the environment accrue with each use past the break-even point.

**Reusable cups and plates are better in almost every one of the 14 standard LCA environmental measures.** All reusable cups (ceramic, stainless steel, glass) have lower CO2 footprints than the single-use options (paper, PET, EPS, PP, PLA, laminated cardboard) when reused.

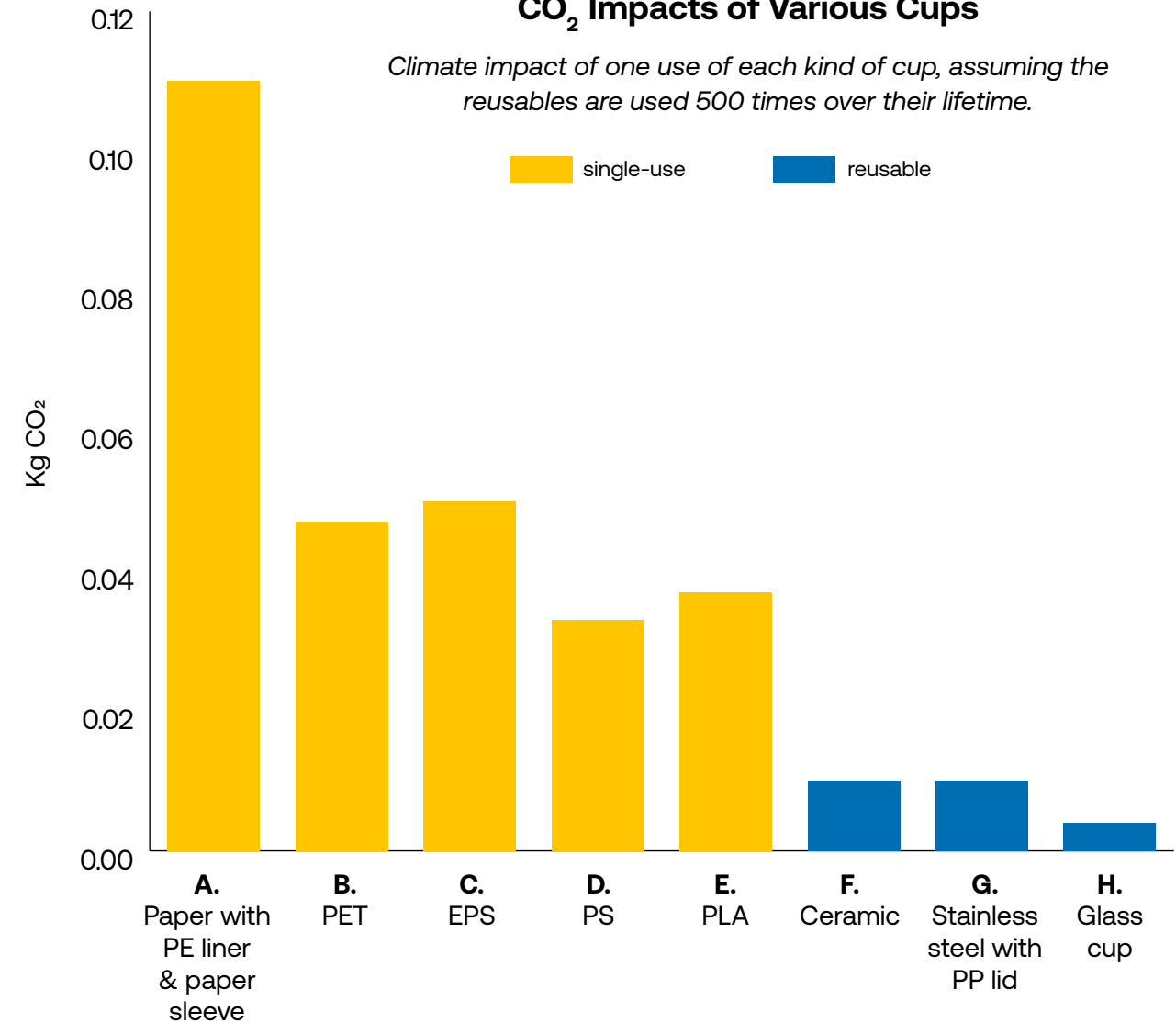
**Reuse protects the climate.** Over their lifecycle, reusable food serviceware has lower greenhouse gas (GHG) emissions compared to disposable alternatives.

- With disposables, the largest greenhouse gas impacts occur in the resource extraction and manufacturing phases, mostly plastics from fossil fuels, paper from trees, bioplastics/biomaterials from crops, and aluminum from mining.
- The GHGs from single-use-disposables dwarf those from reusables once the reusables have been used a certain number of times (the break-even point). This varies according to different types of reusable products, the materials they're made from, the efficiency of the washing machines used, and the sources of energy for the regional electricity grid.
- The main energy impacts of reusables come during washing. With the increasing efficiency of dishwashers, the benefits have increased over time and continue to do so.

**The good news is that transitioning from single-use to reuse is happening already, and it's better for the environment and the bottom line.**

**CO<sub>2</sub> Impacts of Various Cups**

*Climate impact of one use of each kind of cup, assuming the reusables are used 500 times over their lifetime.*



**Reuse saves water.** Over their lifecycle, reusable products, food serveware, and packaging generally use less water than using disposable alternatives.

- Similar to GHG emissions, the largest water use occurs in the resource extraction and manufacturing phases for the different types of disposable materials.
- The water use from single-use-disposables during the production phases is generally greater than that from reusables.
- The main water impacts of reusables come during washing. But these impacts can be greatly reduced with highly-efficient commercial dishwashing systems. Even with

washing, reuse systems still use less water throughout their lifecycle than single-use.

- The water used in the growing phase of bio-based plastics make them a less favorable choice among single-use food serveware options.
- Single-use cups require significantly more water over their lifecycle than ceramic mugs and almost as much water as stainless steel travel mugs. In a study for Starbucks, ceramic reusables reduced water consumption by 64% over the entire lifecycle compared to the disposable paper cup.

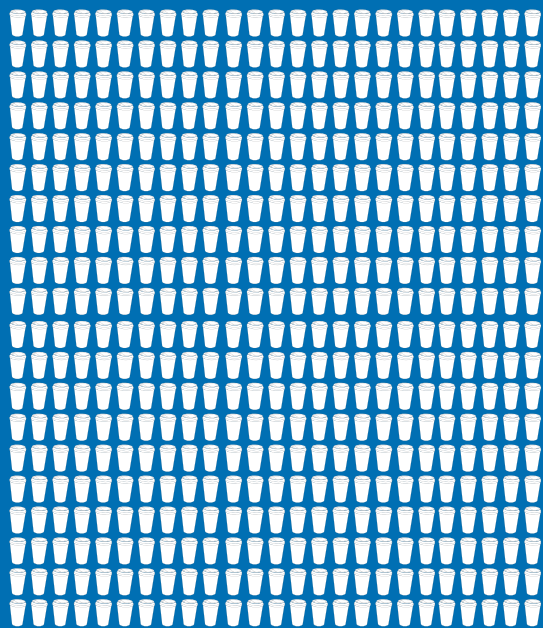
## 8 of the top 10 most-commonly found plastic pollution items during International Coastal Cleanup come from single-use food and beverage packaging.

**Reuse prevents the unnecessary exploitation of our natural world.** Every time we use and throw away a single-use item, we also throw away all the natural resources – the trees, oil, water and energy – used to make and get that product into our hands.

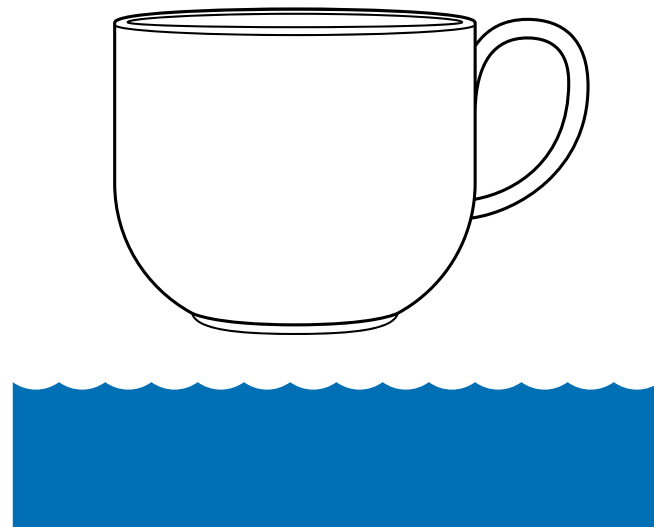
**Reuse stops waste before it starts** and reduces costs for businesses and local governments to manage all the waste. Every time a reusable product is used, the number of single-use items in the waste management system is reduced. Businesses save money not having to buy single-use products and pay for waste hauling, while local governments (and therefore ratepayers and taxpayers) save money because they have less waste to manage.

**Reuse prevents litter and saves communities money.** Litter cleanup costs more than \$11.5 billion each year in the U.S., and a significant portion – roughly 20 billion pieces – is comprised of disposable food serveware. Policies aimed at driving consumers to use reusables, such as plastic bag bans and fees, can dramatically reduce litter.

Using 500 paper cups consumes nearly 370 gallons water



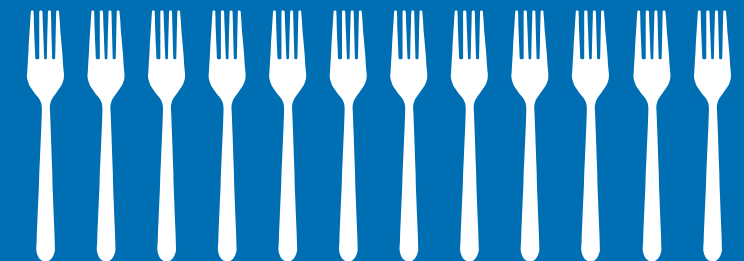
Using and washing one ceramic cup 500 times consumes only 53 gallons of water.



After only two washes stainless steel cutlery breaks even with disposable cutlery for environmental impacts.



After that, every use increases the environmental benefits.





**Reuse protects our oceans and helps curb plastic pollution.** Eight of the top 10 most-commonly found plastic pollution items during International Coastal Cleanup come from food and beverage packaging. Many of the most-commonly found plastic pollution items can be eliminated with reusables.

**Reuse protects our most vulnerable communities that live near extraction, processing, and waste disposal sites.**

Communities located adjacent to oil and gas drilling, mining, manufacturing, and waste incineration facilities are subject to significant health and economic harm. The economic benefits of reusables work the same way as their environmental benefits. The upfront costs are higher, but after just a few uses, the reusable breaks even and then starts to save businesses money.

**Finding Two:  
Transitioning from single-use to reusable food serviceware can save businesses significant amounts of money.**

The economic benefits of reusables work the same way as their environmental benefits. The upfront costs are higher, but after just a few uses, the reusable breaks even and then starts to save businesses money.

Reuse saves businesses money for on-site dining 100% of the time (including schools, food courts, college and corporate campuses, and large-scale venues). Clean Water Fund's *ReThink Disposable* program has demonstrated the short-term payback of switching to reusables in over 166 cases of providing technical assistance

to businesses and gathering cost impact data. In 100% of restaurant case studies and eleven institutional dining programs, the program documented costs savings. The average savings for a small business are between \$3,000 and \$22,000, with environmental benefits that include eliminating 110,000 to 225,000 packaging items per business and 1,300-2,200 lbs. of waste, all on an annual ongoing basis.

**Generally, concerns about added dishwashing and labor costs don't add up in practice.** Fine dining and many casual restaurants already serve all their food on reusable food serviceware. Most fast casual businesses already use some mix of reusables in their operations (for preparing food). Numerous case studies demonstrate that these businesses can transition to reuse without increased labor or need to expand dishwashing capacity. The majority of fast casual restaurants do have installed dishwashers - either three-sink or commercial dishwashers. Meanwhile, food service operators usually don't consider the costs of disposing of significant amounts of disposable food serviceware, the ongoing costs for disposables versus one-time purchases for on-site reusable food serviceware, or the labor costs in managing single-use packaging. Dishwashing is a serious challenge in the typical fast food restaurant, where all packaging is disposable, no commercial dishwasher is installed, and high volumes of customers are served. But retrofits or external dishwashing services can help solve the problem. Future fast food businesses should not be designed for the throw-away model. Such change can be driven by policy and innovation.

Transitioning to reuse increases both customer satisfaction with the dining experience and operator satisfaction with the presentation of their food. It can build brand loyalty and provide community benefits, such as decreased litter cleanup costs.

## Reuse saves businesses money for on-site dining 100% of the time.

Average savings for a small business:



**\$3000 - \$22,000**  
cost savings



**1,300-2,200 lbs. of**  
waste eliminated



**110,000 to 225,000**  
packaging items  
eliminated



**Finding 3:****A new reuse service economy for take-out and delivery is emerging with significant opportunities for entrepreneurs, investors, and customers.**

Companies across the globe are providing restaurants and cafes with reuse services for take-out drinks in reusable cups. From lending libraries and deposit systems that are free to the customer, to customer-subscription services, these options are growing all across the globe.<sup>1</sup>

**Similarly, new services are emerging to provide meals for take-out or delivery in reusables**

– with dishwashing and logistics services, which can replace a restaurant’s existing inventory management for disposables.

**Reusable cup systems are being innovated at large venues like arenas and stadiums** with a number of companies offering services in U.S. markets – including mobile dishwashing at events.

**Innovators are also changing home delivery for groceries, personal care products and sundries with reusable container systems and services.**

In addition, new companies are innovating touch-free bulk shopping at grocery stores with standardized containers on site to simplify the process for consumers.

Reuse creates jobs. A new reusables economy is springing into action in response to the backlash against single-use plastics. Innovative new businesses are providing jobs in the collection, cleaning, and distribution of reusable products and changing the way products are delivered to consumers.

As these services grow and iterate, we will learn what drives success. But the benefits are clear. Reuse eliminates waste before it starts. It is better for the planet by almost every measure. Eliminating waste saves government and businesses money and makes the dining experience more enjoyable.

We should accelerate the change away from our current throw-away culture by enacting policies, investing in solutions, and supporting businesses that recognize our planet and its inhabitants are not disposable.

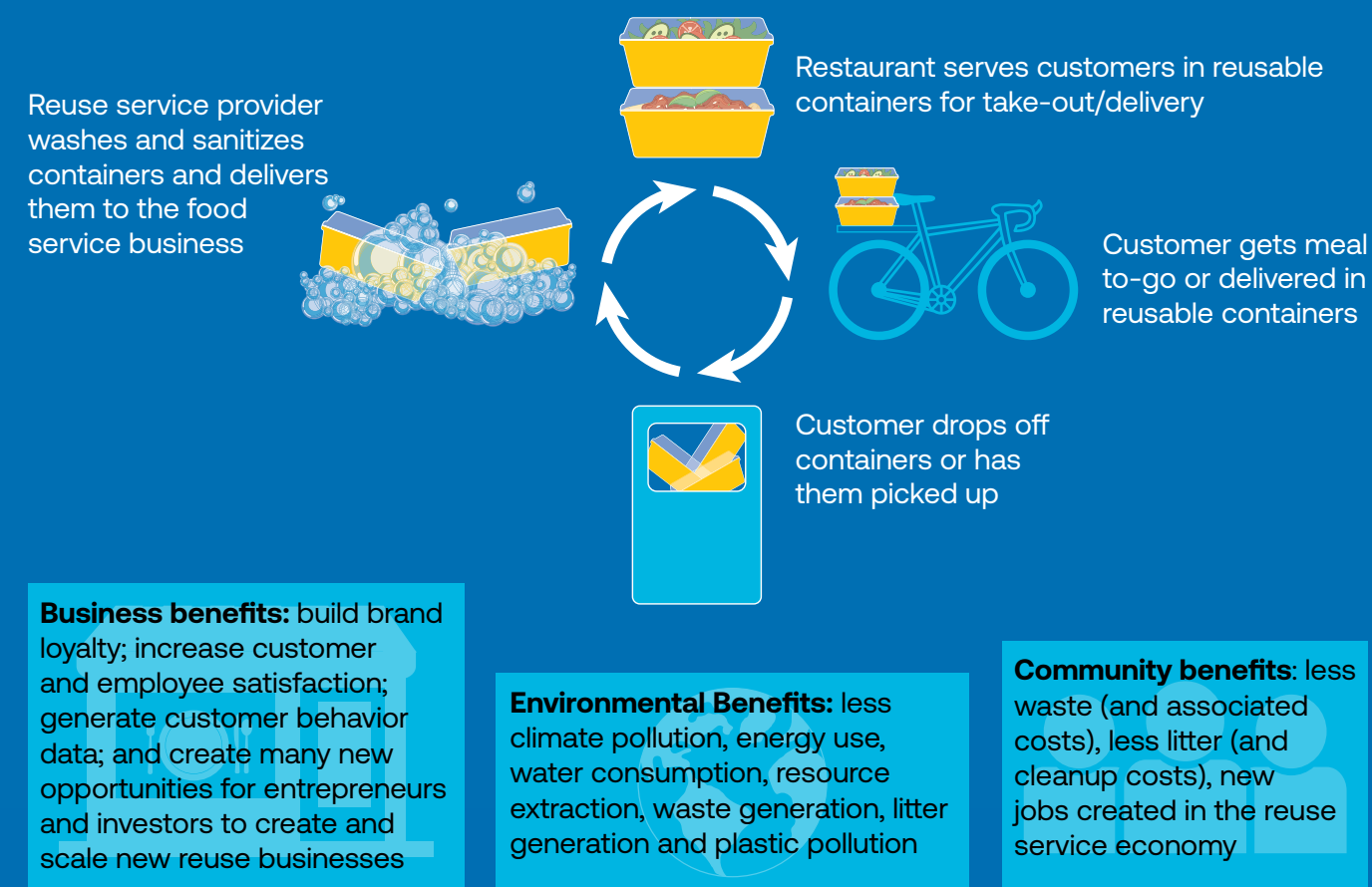
**Key takeaway:****The Future of Food Service is Reusable**

Today, much of institutional and fast casual dining – and virtually all takeout and delivery – happens using disposable food-service ware. And all those takeout containers, bags, boxes, condiment packets, plastic utensils, cold and hot cups and lids, and napkins add up. **Nearly one trillion disposable food service products are used each year in the United States.**

Unfortunately all these disposables come with costs – costs to the environment from natural

resource extraction to climate impacts to plastic pollution; costs to food-service businesses from the ongoing procurement and on-site waste management of disposables; and costs to governments and taxpayers from solid waste costs and litter cleanup. These costs also represent lost opportunities to create better systems for getting consumers what they want without all the waste.

But the good news is that there’s a new reuse economy emerging for food service that has the potential to completely disrupt our current disposable food-service paradigm and replace it with something better.

**How reuse services for take-out and delivery work**

<sup>1</sup> Check out Upstream’s [Reuse Service Business Directory](#) to learn more.



## The New Reuse Economy for Food Service

### REUSE FOR ON-SITE DINING

Whether you're dining at McDonald's or a trendy new fast casual eatery, disposables for on-site fast-food dining are the norm. This is because a prevailing misconception is that disposables are cheaper than reusables.

But this argument doesn't hold up in practice. Data from hundreds of case studies shows that making the switch from single-use to reuse for on-site dining always ends up saving money - 100% of the time. And that's after accounting for any capital costs for purchasing or leasing additional dishwasher capacity and any added labor costs.

### REUSE FOR TAKE-OUT AND DELIVERY

With take-out and delivery, it might seem like the only options are between disposable paper or plastic, but scores of new businesses are emerging to offer reuse B to B (to C) services and solutions to hack all this take-out packaging waste. Their services are easy to use, accessible, affordable, fun and convenient, and are revolutionizing how businesses do take-out by offering a circular system for collection, washing and sanitizing, and restocking reusable food-service ware. Food-service businesses can contract with these "reuse service-providers" for the amount and types of reusable to-go ware they desire.

### Food service by the numbers:

#### TODAY'S "ONE-WAY, THROW-AWAY" ECONOMY:

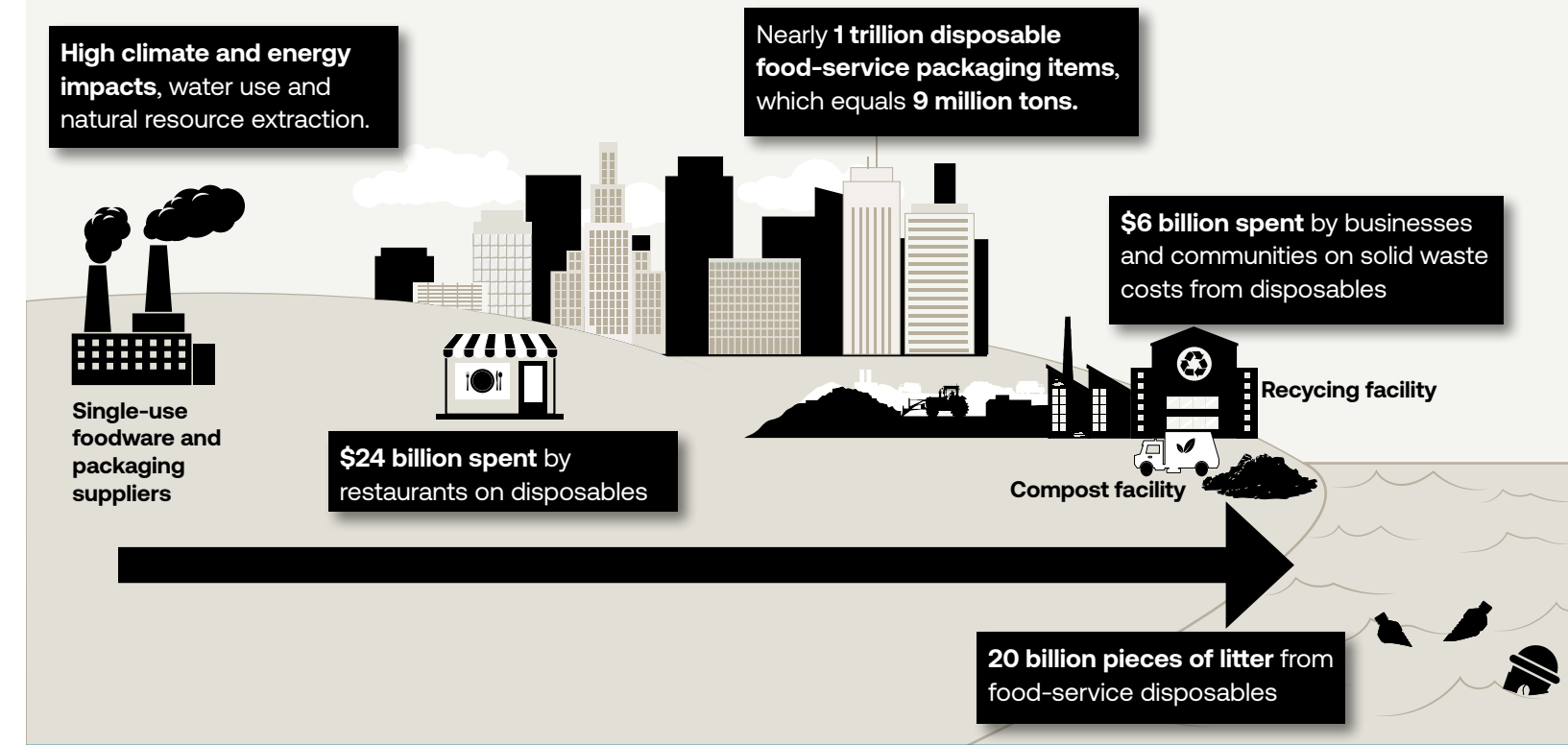
- Nearly 1 trillion individual pieces of disposable foodware and packaging used by US restaurants and food service businesses. This breaks down as 21% for on-site dining and 79% for take-out and delivery.<sup>1</sup>
- \$24 billion spent by restaurants and food-service businesses on disposables each year.<sup>2</sup>

- Nearly 9 million tons equals the total weight of all the disposables used - equivalent to the weight of 25 Empire State Buildings.<sup>3</sup>
- \$6 billion spent by businesses and city governments on solid waste management costs attributable to disposable food packaging.<sup>4</sup>
- Roughly 20 billion pieces of litter are from disposable food-service packaging.<sup>5</sup>

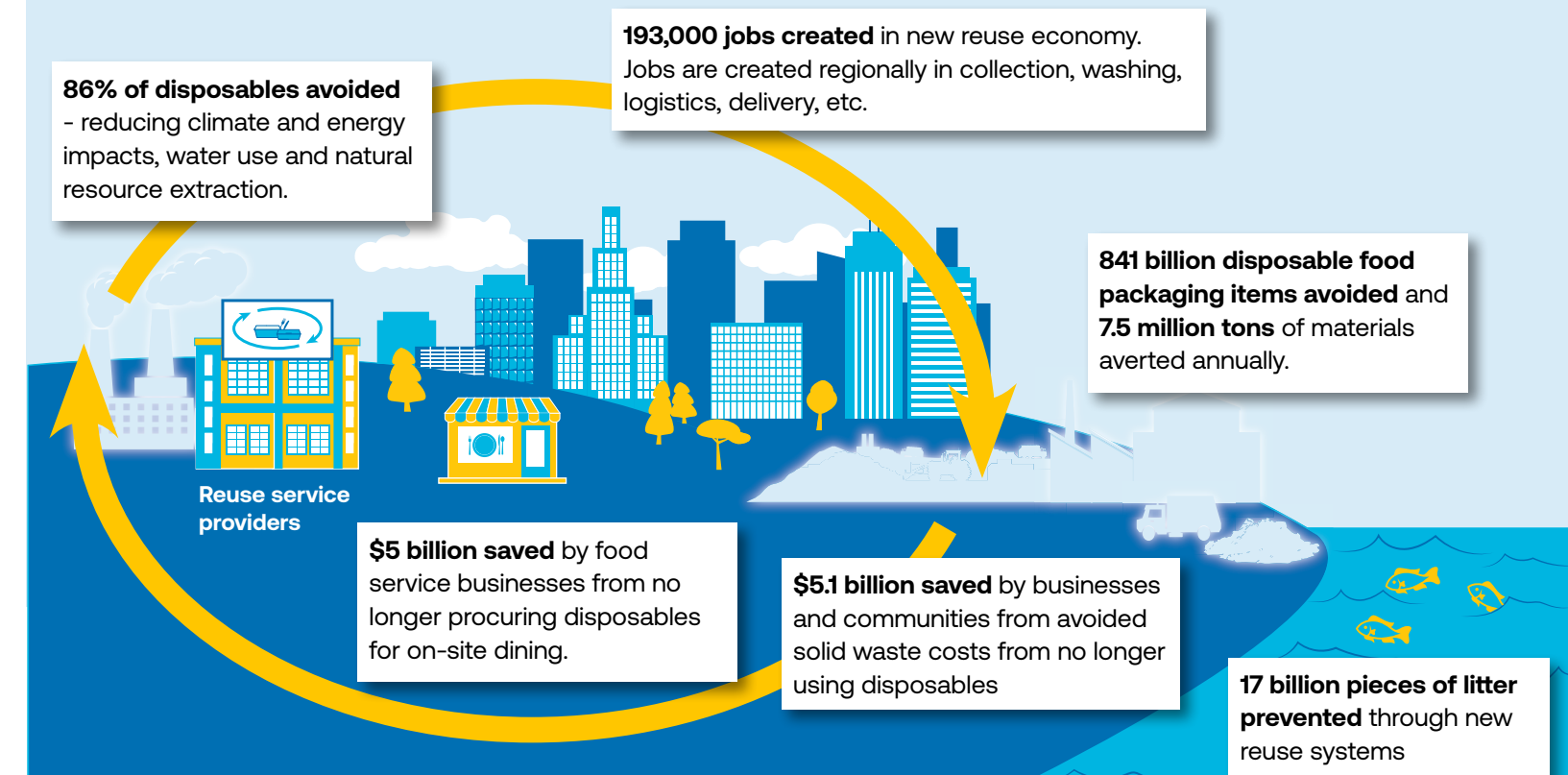
#### TOMORROW'S NEW REUSE ECONOMY:

- 86% of disposables avoided through 100% of on-site dining being disposable-free and new reuse services for take-out and delivery expanded to all US cities and urban areas.<sup>6</sup>
- 841 billion disposable food packaging items avoided meaning that 7.5 million tons of materials would be averted annually.
- \$5 billion saved by food service businesses from no longer procuring disposables for on-site dining.
- \$5.1 billion saved by businesses and city governments on solid waste management costs attributable to disposable food packaging.
- 17 billion pieces of litter prevented through new reuse systems. The reusable products (cups, containers, cutlery, bags, etc) have value - like a deposit, or a charge if not returned - that ensures these products make their way back into the system.
- 193,000 jobs created in the new reuse economy for food service. These are community-based systems. They create infrastructure and jobs in the community that cannot be outsourced. And they keep money in the community instead of shipping it out to where the disposable packaging gets manufactured or where the materials to make disposables get mined from the planet.<sup>7</sup> ♦

## Today's "one-way throw-away" food service model



## Tomorrow's new reuse economy for food service



## Endnotes

**1** Rich Grousset, Senior Vice President, Re:Dish- based on calculations using data from "Overbrook Foundation: The Dirty Truth About Disposable Foodware" and The Freedonia Group (<https://www.freedoniagroup.com/Food-Service-Single-Use.html>)

**2** Rich Grousset, Senior Vice President, Re:Dish – based on the Freedonia Group (<https://www.freedoniagroup.com/Food-Service-Single-Use.html>)

**3** Rich Grousset, Senior Vice President, Re:Dish – updated calculations used in "Overbrook Foundation: The Dirty Truth About Disposable Foodware," but updated to reflect increased product pricing (based on growth rates provided by the Freedonia Group report) and the \$24 billion in sales projected by Freedonia Group.

**4** Rich Grousset, Senior Vice President, Re:Dish – Based on the following: "In the U.S., about \$200 billion a year is spent on solid waste management and lost energy resources from disposing trash, according to Dancy." <https://www.latimes.com/world/global-development/la-fg-global-trash-20160422-20160421-snap-htmstory.html>. Used mass of total waste in U.S. from EPA and total mass of single-use products (nearly 9 million tons) to calculate fraction of total waste represented by disposables. Then applied that fraction to \$200 billion.

**5** 2% of waste generated in high-income countries such as the United States estimated to end up as litter, according to Law, K.L., Star, S., Siegler, T.R., Jambeck, J.R., Nicholas (2020) "The United States' contribution of plastic waste to land and ocean," *Science Advances*, 6/44

**6** Rich Grousset, Senior Vice President, Re:Dish. Assumption is that take-out and delivery in urban areas switches to reusable. Urban population is 82.46% of total. Combined 100% of onsite and 82.46% of take-out results in 86% conversion to reuse.

**7** Rich Grousset, Senior Vice President, Re:Dish