



# **The Complex Reality of Reusable Packaging in Europe**

**Environmental, financial and operational impacts**



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# Introduction

## About McDonald's

McDonald's is a leading global foodservice retailer, with more than 43,000 restaurants in over 100 countries,<sup>1</sup> serving millions of customers every day. Behind our Golden Arches is a global community of crew, farmers, suppliers, Franchisees and countless others who make up who we are as a brand.

At the end of 2024, approximately 95% of McDonald's restaurants were franchised. Franchisees independently run local businesses backed by a global brand.

43,000+

McDonald's  
restaurants globally

95%

restaurants franchised and  
operated independently

2M+

people work in  
McDonald's restaurants

65M

customers served  
every day

## McDonald's in Europe

This report provides analysis using data from McDonald's supply chain and restaurants in Europe. McDonald's is a leading player in the European foodservice industry, serving communities for over 50 years. With a presence in 30 European countries, across more than 8,000 restaurants,<sup>2</sup> McDonald's and its Franchisees provide jobs for over 500,000 people aged 16 to 65. The brand serves 12 million customers daily in Europe, making it one of the most frequented foodservice restaurant companies.

### Key Definitions:

**McDonald's:** Our global brand, unless specified otherwise.

**We/Our/The Company:** McDonald's Corporation and its majority-owned subsidiaries worldwide.

**The System:** The Company, its Franchisees and suppliers are collectively referred to as the "System" – also known as McDonald's "three-legged stool."

**Franchisees:** Collective group of independent individuals and entities owning and operating McDonald's restaurants under one of the following structures – conventional franchise, developmental license or affiliate. For more information on the Company's structure and scope see our latest **Annual Report**.

**McDonald's Restaurants/Restaurants:** Includes restaurants owned by the Company and its Franchisees.

## About This Report

This report presents insights into the potential environmental, operational and financial impacts of introducing reusable packaging in McDonald's restaurants. The report highlights progress made toward McDonald's packaging ambition. It also discusses the potential implications of reusable packaging, as well as McDonald's single-use guest packaging, which is designed for recycling.

The report is informed by McDonald's experience and insights from improving the sustainability and recycling of our single-use packaging, as well as implementing reusable packaging in certain restaurants in Europe as required by law. The findings are based on a combination of real data from McDonald's restaurants and supply chain, along with a set of assumptions about average conditions in Europe to allow comparability between the scenarios. The findings offer an impact of a scenario, rather than a reflection of actual results of a specific restaurant in a specific country. The applicable assumptions are explained in detail in the appendix.

McDonald's commissioned PwC UK to conduct an analysis of environmental and financial impacts of different packaging systems on four specific scenarios based on McDonald's experience in certain European countries. Where noted, charts from this data analysis have been used in this report. This analysis used proprietary data from McDonald's along with third-party data sources, as detailed in the appendix.

<sup>1</sup> As of the end of 2024.

<sup>2</sup> As of the end of 2024.



# Executive Summary

**At McDonald's, we use a wide range of guest packaging and believe that hygiene, food safety, quality, functionality and sustainability are critical aspects to packaging design. We strive to accelerate solutions that reduce packaging waste, transition to more sustainable packaging materials, move away from virgin fossil fuel-based plastics and promote circularity. As of year-end 2024, 90.93% of our global primary guest packaging<sup>3</sup> (95.2% in Europe) was sourced from renewable, recycled or certified materials.**

Recognizing that reducing the use of plastic and substituting plastic with certified or recycled paper are two of the key interventions to address plastic pollution,<sup>4</sup> we are removing or reducing plastic use by redesigning packaging items. For example, we have partnered with our suppliers to advance technologies to replace plastic lids and sundae ice cream cups<sup>5</sup> with innovative fiber solutions. Most of McDonald's primary guest packaging is fiber-based (82% globally and 96% in Europe as of year-end 2024), meaning it is primarily made from materials such as paper, pulp, cardboard or wood.

In addition to designing our packaging for recyclability, we are working to help advance the recycling of guest packaging globally. In 2024, 89.6% of restaurants in markets with advanced infrastructure<sup>6</sup> offered guests the opportunity to recycle and/or compost packaging items, with customer-facing bins for back-of-house or off-site sorting. We are also working with external partners to establish and improve recycling. For example, in Poland we work with a paper recycler on proprietary technology to be able to fully recycle food-contaminated paper packaging along with polyethylene-lined paper cups. McDonald's fiber-based packaging waste is collected from our restaurants in Poland for recycling, and the recycled paper is then sold back to our restaurants as toilet paper, paper towels and cup carriers. As of June 2025, 95% of the packaging collected from restaurant customers is recycled.

We believe there is not one solution to advancing circularity; it requires fact-based dialogue and evidence among stakeholders – including leveraging business expertise. Solutions need to consider implications at each stage of the value chain, be tailored to sector and local conditions, be rooted in customer safety and hygiene, and balance economic, environmental and consumer outcomes.

Globally

90.93%

In Europe

95.2%

of our primary guest packaging was sourced from renewable, recycled or certified materials

Globally

82%

In Europe

96%

of McDonald's primary guest packaging is fiber-based, meaning it is made from materials such as paper, pulp, cardboard or wood

<sup>3</sup> Primary guest packaging: Single-use fiber and plastic packaging used to package guest food and drinks on premises at McDonald's restaurants that is given to customers in all order channels, including cups, lids, bags, cartons and clamshells, napkins, wraps, cup carriers, cup sleeves, salad and dessert and breakfast packaging, bowls and containers, straws, cutlery, stirrers and associated wrappers. This also includes Happy Meal toy and book packaging, all coatings on fiber-based packaging and items made of 100% non-wood Alternative Natural Fibers.

<sup>4</sup> Breaking the Plastic Wave, [a report from The Pew Charitable Trusts](#).

<sup>5</sup> These solutions are being deployed across Europe and in other markets around the world.

<sup>6</sup> Markets with advanced infrastructure: Mature waste and recycling infrastructure at a national level that has (1) a recycling infrastructure network across the entire market, (2) multiple materials being recycled within this national infrastructure network, (3) existing legislation on recycling and (4) high customer awareness of waste and recycling. At the end of 2024, that included 21 markets where McDonald's operates.



# Introducing Reusable Packaging

Reusable packaging is packaging for food and beverages that customers can use and then return to a business, such as a restaurant, where it is washed and then reused for another customer.

Reusable packaging is viewed by some policymakers as a solution to reduce packaging and plastic waste, which has led to regulatory requirements that limit the use of single-use packaging materials or mandate reusable packaging. These regulations apply to the foodservice industry, encompassing businesses that prepare and serve food and beverages outside of the home, including restaurants, cafés, hotels and catering services. Around 1.96 million enterprises operate in the EU’s accommodation and food services sector ([Eurostat 2022](#)).

In 2025, the European Union’s (EU) new Packaging and Packaging Waste Regulation (PPWR) takes effect, with measures including offering customers the option of bringing their own packaging for takeout from 2027, offering customers the option of reusable packaging for takeout from 2028 and a ban on single-use plastic packaging for dine-in from 2030. Final distributors should also endeavor to offer 10% of products in a reusable packaging format from 2030.

In response to local requirements, McDonald’s has developed a reusable packaging portfolio, made of durable plastic, and continues to test, learn and implement solutions required for washing reusables, educating customers and driving returns, and adapting restaurant design and operations to maintain food safety and customer experience.

7 Percentage of menu items sold for takeout in reusable packaging between January and June 2024.

# Assessing the Impact of Reusable Packaging

Based on McDonald’s experience from implementing reusable packaging in three European countries, this report analyzes the potential environmental, financial and operational impact of reusable packaging in comparison to McDonald’s single-use guest packaging. McDonald’s commissioned PwC UK to conduct an analysis of environmental and financial impacts of different packaging systems in four specific scenarios, based on McDonald’s experience in certain European countries. Where noted, charts from this data analysis have been reproduced in this report. This analysis used proprietary data from McDonald’s, along with third-party data sources, as detailed in the appendix.

**The report analyzed four reusable packaging scenarios, based on existing legal requirements, and compared them to a single-use packaging scenario. The average number of uses detailed below represent data captured between January 2024 and end of June 2024.**

- **Single-use scenario:** All packaging items are single-use and primarily fiber-based – based on McDonald’s existing single-use packaging portfolio in Europe.
- **Scenario A (France):** Reusable packaging is mandatory for dine-in only. Fiber wraps are permitted for all sandwiches and burgers. The observed average number of uses for reusable packaging items is 33.9.
- **Scenario B (the Netherlands):** All dine-in drinks and the McFlurry® are served in reusable cups. For takeout, customers can choose a reusable cup (with a deposit return scheme, which can be returned to any McDonald’s restaurant in the Netherlands) or a single-use cup. The observed average number of uses is 3.4 for dine-in and 1.5 for takeout.

- **Scenario C (Germany):** For both dine-in and takeout, customers can choose single-use cups or reusable cups for drinks, the McFlurry and the sundae (with a deposit return scheme). The observed average number of uses is 2.6 for dine-in and takeout.
- **Scenario 2030:** To estimate the potential impact of the EU PPWR requirement to offer reusable packaging for takeout, the analysis models the effects of using reusable packaging for 10% of menu items sold for takeout. The average number of uses modeled (2.6) is based on the observed number of uses in Scenario C (Germany), where reusables have been offered since 2022.

The impact of reusable versus single-use packaging is highly dependent on a range of factors, including the average number of uses, materials used, type of packaging items, size and weight of packaging items, the recycling rate of single-use packaging and on-site versus off-site processes for washing reusable packaging.

**Where reusables were optional for the customer, most customers still chose single-use packaging.**

| Scenario B<br>(takeout)                                                            | Scenario C<br>(dine-in and takeout) |
|------------------------------------------------------------------------------------|-------------------------------------|
| 4%                                                                                 | <1%                                 |
| <b>of customers chose reusable packaging, based on menu items sold<sup>7</sup></b> |                                     |



For reusables to reach the breakeven<sup>8</sup> point or have comparable or lower environmental impacts compared to single-use packaging, an optimal number of uses must be achieved. The number of uses achieved is impacted by items that are not returned by customers, as well as items that may be returned but not reused due to damage.

For takeout, the average number of reuses observed is very low, due to a low number of customers returning the reusables. For dine-in, where reusable packaging items are not intended to leave the restaurant, a higher number of reuses has been observed relative to takeout.

## Environmental Impact – Key Findings

Overall, the analysis highlights that introducing reusable packaging in McDonald's restaurants does not achieve an overall positive impact compared to single-use packaging across the impact areas measured and the scenarios modeled.

The analysis shows an overall negative environmental impact of reusable packaging compared to single-use packaging when implemented against the EU PPWR requirements in 2030, which impact over 6,900 McDonald's restaurants in the EU. Across the scenarios, there are varying results dependent on the environmental indicator, which means there are environmental trade-offs.

The results highlight that when reusables are offered for dine-in and takeout in McDonald's restaurants, plastic waste from guest packaging increases. This is due to the shift from McDonald's fiber-based single-use packaging to reusable packaging made entirely from plastic.

**The progress made by McDonald's to minimize the amount of plastic used in our single-use packaging means:**

**100+**

**uses of a reusable packaging item are needed to achieve a breakeven (a comparable or lower impact) on plastic waste under Scenario 2030**

**When 10% of menu items sold for takeout are in reusable packaging (Scenario 2030)**

**61%**

**increase in GHG emissions per restaurant per year**

**626%**

**increase in plastic packaging waste per restaurant per year**

### Plastic Waste and Fiber Waste

The analysis finds that when reusables are offered for dine-in or takeout, plastic waste increases and fiber waste decreases (compared to using fiber-based single-use packaging). The change in plastic waste and fiber waste volumes is dependent on the number of customers using reusables and the average number of reuses achieved. In the 2030 scenario, when 10% of menu items sold for takeout are in reusable packaging, plastic packaging waste increases more than six times (626% per restaurant per year), while fiber waste reduces by 12%.

### Greenhouse Gas (GHG) Emissions

The analysis indicates that GHG emissions associated with guest packaging (linked to production, transport, energy use for washing reusables and end-of-life) typically increase where reusables are offered for takeout and dine-in (compared to fiber-based single-use packaging). Under Scenario 2030, with 10% of menu items served in reusables for takeout, GHG emissions increase by 61% per restaurant per year.

8 The breakeven point is calculated by adjusting the number of reuses in each scenario until the environmental impact is equal to the Single-use scenario.



The analysis shows that, per item, GHG emissions associated with packaging production are higher for reusable plastic items compared to fiber-based single-use items, and the process of washing the reusable items also generates emissions, which means a sufficiently high number of reuses needs to be achieved to offset the emissions from production and washing.

The analysis also shows that the scale of impact can vary, dependent on which single-use packaging items are replaced with reusables. In Scenario A, if paper wraps (used for sandwiches and burgers) were replaced with reusable containers, GHG emissions would increase by 30% per restaurant per year.

The assumed recycling rates used in the analysis also influence the impact on GHG emissions. The Single-use scenario has an assumed and cautious recycling rate for fiber-based packaging of 46% for dine-in and 3% for takeout. However, a higher recycling rate would reduce the GHG emissions associated with single-use fiber-based packaging (such as the 92% fiber recycling rate for dine-in packaging in McDonald’s Germany).

If the fiber recycling rate modeled increased to 80% for dine-in and 30% for takeout, this would lead to an 11% reduction in GHG emissions for dine-in and an 8% reduction for takeout (per restaurant per year) in the Single-use scenario. This underpins the importance of further advancing recycling infrastructure and collection processes available in Europe.

Water Consumption

Under Scenario 2030, with 10% of menu items served in reusables for takeout, water consumption increases by 15% compared to the Single-use scenario, but the results show varying reductions for Scenarios A, B and C.

The analysis shows that water consumption associated with guest packaging production can decrease when introducing plastic reusables, principally due to renewable fiber packaging production consuming more water than plastic packaging production. However, additional water consumption is required for the washing process for reusables – with water consumed in the generation of energy to power the dishwashers.

The analysis does not include water used directly to rinse and wash reusable packaging, as it assumes most of that water is returned to the local water source after being processed at local water treatment plants. Additional water will be consumed during the production of detergents used for washing and during the wastewater treatment process, but those impacts are not included in this analysis.

While the modeling measures water consumption, water use and location are also important considerations. Implementation of reusable packaging relocates water consumption and use from a small number of fiber packaging production sites (mainly in Scandinavia) to restaurant locations and energy generation facilities, including in more water-scarce areas. Just under a third of McDonald’s EU restaurants are in extremely high or high water stress regions.<sup>9</sup>

30%

increase in GHG emissions per restaurant if paper wraps for sandwiches were replaced with reusable containers (Scenario A)

8%

reduction in GHG emissions per restaurant can be achieved in the Single-use scenario, if the assumed recycling rate for fiber-based packaging waste from takeout increased from 3% to 30%

11%

reduction in GHG emissions per restaurant can be achieved in the Single-use scenario, if the assumed recycling rate for fiber-based packaging waste from dine-in increased from 46% to 80%

15%

increase in water consumption per restaurant under Scenario 2030

9 According to a McDonald’s assessment, utilizing information from World Resources Institute Aqueduct 4.0. Water stress measures the ratio of total water demand to available renewable surface and groundwater supplies. Extremely high or high indicates substantial competition for water resources.



# Financial and Operational Impact – Key Findings

## Financial Impact

CAPEX impacts arise primarily from remodeling restaurants for storage, sorting and introducing washing systems. OPEX impacts stem from changes in the quantities of packaging purchased, washing costs and end-of-life fees.

The decision to use on-site or off-site washing will depend on several factors. On-site washing could have a lower cost per item, but requires investment in remodeling restaurants to install washing facilities. Washing may need to be done off-site, as some restaurants will have physical constraints. However, off-site washing facilities and distribution to and from the restaurant may not be practical or available.

## Operational Impact

Serving safe and quality food in every single restaurant, each and every day, is a top priority and long-standing commitment of McDonald's. Introducing reusable packaging significantly impacts restaurant operations and requires new processes to manage food safety. Restaurants require larger spaces for storage (of sturdy plastic reusables in comparison to compact fiber packaging) and washing and drying facilities. Effectively and safely washing reusables is crucial for hygiene and food safety. On-site and off-site washing options have been tested to meet washing standards, with the best choice depending on projected volumes, available space, external provider availability, distance to washing sites and costs. A unidirectional process is required to manage receipt of both clean and used reusables to prevent cross-contamination and ensure food safety.

## Customer Experience

A major consideration when implementing reusable packaging is customer convenience. Reusable packaging adds steps and complexity to the customer experience.

Additional collection points and processes are required to enable customers to return used packaging without disrupting the customer journey and speed of service. Ensuring customers do not leave with or dispose of reusable packaging in dine-in settings is essential. This means that customers can no longer leave the restaurant with food and drinks that they wish to finish on-the-go. For takeout, setting deposit rates correctly for reusables is crucial to avoid deterring customers from choosing reusables due to increased costs but also ensuring the deposit incentivizes a return.

Incentives, such as deposits, may not drive adequate returns. In Scenario B and C, where customers can choose reusable or single-use packaging, deposit systems are in place and we are experiencing a low number of returns among customers who choose reusables.

## McDonald's Learnings

Overall, for reusable packaging to have a positive impact compared to single-use packaging, it depends on a high volume of customer returns and achieving the optimal number of reuses. Compared to fiber-based single-use packaging, widespread implementation of reusables will typically increase plastic waste and GHG emissions. Positive environmental impacts require reuse rates that far exceed those currently observed – which would require significant changes in customer behavior. Even then, there are significantly increased operational costs and complexity and low customer demand for reusables.

McDonald's believes, based on evidence presented in this report and others, that legislation mandating or incentivizing reusable packaging could lead to negative environmental and economic consequences. Before foodservice restaurant operators are compelled by law to make investments to implement reusable packaging (and associated washing and return systems), evidence-based information about the impact of reusable packaging in the sector – including customer behavior on returning reusables and the associated environmental and economic impacts of more widespread use – should be taken into account.

McDonald's believes that renewable, recyclable and certified fiber-based packaging, as well as advancing recycling, recovery and reduction strategies, must continue to be part of the solution to waste management. By continuing to reduce and optimize our existing packaging and partner to expand recycling, we have a greater opportunity to drive positive environmental outcomes.



## McDonald's Approach to Packaging

**McDonald's uses a wide range of packaging to meet the needs of our menu items and our customers. We believe that hygiene, food safety, quality, functionality and sustainability are critical aspects to packaging design. Packaging is a central component to delivering hot food safely – for both restaurant crew and customers – and to delivering the memorable experience McDonald's customers expect.**

**Our aim is for our packaging to be suitable for all service channels, including dine-in, drive-thru and delivery. For example, it should be designed to be convenient for eating on-the-go, to help avoid spills, and to maintain the integrity and shape of food during delivery.**



# Reducing Packaging Waste and Transitioning to More Sustainable Materials

**McDonald's strives to accelerate solutions that help reduce packaging waste, transition to more sustainable packaging materials and promote circularity.**

The Company's strategy focuses on:

- 1. Eliminating unnecessary packaging or materials and streamlining materials for easier recovery.
- 2. Transitioning away from virgin fossil fuel-based plastics.
- 3. Sourcing materials responsibly and increasing the use of recycled materials.
- 4. Increasing the scale of circular solutions – including improving recycling rates for guest packaging and making it easier for customers to recycle, where infrastructure exists.

## Packaging as Part of McDonald's Net Zero Ambition

In 2023, the Science Based Targets initiative (SBTi) validated the Company's global 2050 net zero emissions reduction target and adjusted 2030 global emissions targets, aligned with the latest guidance to help keep global temperature rises below 1.5°C.<sup>10</sup>

The Company is committed to identifying and investing in strategies that can help drive the greatest emissions reductions – including packaging and waste, our supply chain and restaurant energy.

While we estimate that packaging makes up less than 3% of McDonald's global GHG emissions footprint, the introduction of reusable packaging and the associated energy used for washing would typically increase the GHG emissions footprint of a McDonald's restaurant, based on evidence presented in this report – which is important to understand when evaluating the impact of reusable packaging.

## Single-Use Guest Packaging Innovation

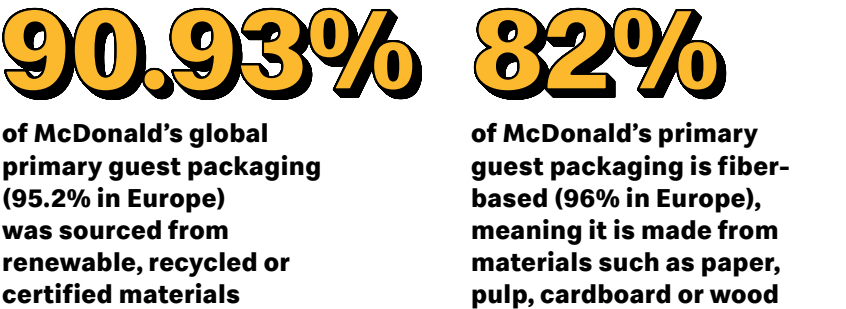
As of the end of 2024, 90.93% of our global primary guest packaging<sup>11</sup> (95.2% in Europe) was sourced from renewable, recycled or certified materials. Approximately 98.99% of our global fiber-based primary guest packaging was sourced from recycled or certified sources in 2024.

To identify opportunities for transitioning our existing materials to new and more sustainable alternatives, McDonald's has worked to drive locally relevant packaging innovations across the globe. We are removing or reducing plastic use by redesigning items such as switching to paper-based straws, deploying new McFlurry cups without plastic lids and introducing salad boxes and cutlery made from renewable fiber. We have also worked with our suppliers to advance innovative molded fiber technologies to replace plastic lids and sundae ice cream cups. We are deploying these renewable molded fiber solutions across Europe and in some other markets around the world.

As noted in "Breaking the Plastic Wave," a report from The Pew Charitable Trusts, substituting plastic with paper and compostable materials is one of the key interventions to address plastic pollution. Most of McDonald's primary guest packaging is fiber-based (82% globally and 96% in Europe as of year-end 2024), meaning it is primarily made from fiber materials such as paper, pulp, cardboard or wood. The majority of fiber-based items do not include plastic, but some are composites, meaning they have plastic-based components that are added for reasons such as food safety or functionality. For example, a fiber-based hot beverage cup may have a polyethylene liner on the interior to ensure the integrity of the cup and prevent leaks.

When it comes to developing alternatives for packaging liners, we are investing in technology and supply chain capabilities and collaborating with our suppliers to do so. To replace virgin fossil fuel-based plastics, we are gaining insight into innovative technologies, such as mineral coatings for cups, and the potential for such technologies to be applied at scale.

It's critical that we continue to offer customers the great value and quality experience they expect, which is why new packaging solutions must meet food safety requirements and customer expectations while supporting our packaging goals.



10 For more details on McDonald's climate commitments, please visit our [Climate Action](#) web page.

11 Primary guest packaging: Single-use fiber and plastic packaging used to package guest food and drinks on premises at McDonald's restaurants that is given to customers in all order channels, including cups, lids, bags, cartons and clamshells, napkins, wraps, cup carriers, cup sleeves, salad and dessert and breakfast packaging, bowls and containers, straws, cutlery, stirrers and associated wrappers. This also includes Happy Meal toy and book packaging, all coatings on fiber-based packaging and items made of 100% non-wood Alternative Natural Fibers.



# Introduction of Reusable Packaging

**Reusable packaging is guest-facing packaging for food and beverages that customers can use and then return to McDonald's, where it is washed and reused.**

Reusable packaging is viewed by some public policymakers as a solution that could help reduce packaging and plastic waste associated with the foodservice industry (including restaurants, cafés, hotels and catering) and facilitate a transition toward a more circular economy. Around the world, local and national governments have proposed or established packaging requirements applicable to foodservice restaurants, which limit the use of single-use packaging materials or mandate reusable packaging.

One example is the EU's updated Packaging and Packaging Waste Regulation (PPWR), which affects more than 6,900 McDonald's restaurants across the EU and the European Economic Area.<sup>12</sup> With respect to foodservice restaurants, PPWR will require restaurants to offer customers the option of bringing their own packaging for takeout beginning in 2027, to offer reusable packaging for takeout from 2028 and prohibit the use of single-use plastic packaging for dine-in from 2030. Final distributors should also endeavor to offer 10% of products in a reusable packaging format from 2030.

McDonald's believes, based on evidence presented in this report and others, that legislation mandating or incentivizing reusable packaging could lead to environmental and economic consequences. Before foodservice restaurant operators are compelled by law to make investments to implement reusable packaging (and associated washing and return systems), evidence-based information about the effectiveness of reusable packaging in the sector and the associated environmental and economic impacts of more widespread use should be taken into account. McDonald's believes that renewable and certified fiber-based packaging, as well as advancing recycling, recovery and reduction strategies, must continue to be part of the solution to waste management. We remain concerned that the PPWR requirement to offer

reusables for takeout drives high risks for the environment and significant complexity for EU businesses.

## Developing and Testing Reusable Packaging

McDonald's has developed a reusable packaging portfolio, made of plastic, to respond to reusable packaging requirements as they arise. Items are designed to match existing single-use packaging to help minimize impact on restaurant operations, functionality, quality and customer experience. Some examples are included in the graphic below.

Reusable packaging is introduced to McDonald's restaurants based on the applicable legislation, including which items are required to be reusable, and whether the law applies to dine-in, takeout or some combination.

McDonald's has researched various materials for reusable packaging globally and identified polypropylene as the preferred global material for its suitability for food contact.<sup>13</sup> McDonald's reusable packaging does not contain any post-consumer or post-industrial recycled plastic due to food safety requirements in certain countries. Materials must pass tests for durability, washing ease, global availability, cost, recyclability, weight, handling, safety, food quality and food safety standards.

Ceramics, metals, glass and non-food-safe plastics were rejected due to safety concerns and the impracticality of serving millions of customers with heavier, brittle materials across both dine-in and takeout.

Examples of single-use packaging items and their reusable counterparts.

| Single-use | Reusable |
|------------|----------|
|            |          |

<sup>12</sup> As of year-end 2024.  
<sup>13</sup> Some of McDonald's reusable packaging items are made from Tritan™, which is reflected in the analysis.



Our washing tests show that McDonald’s reusable packaging can be washed and reused more than 200 times, but we are still learning about the effects of wear and tear from customer use over time, which may reduce the potential lifespan of a packaging item.

Additional packaging design considerations:

- Space-saving designs to enable more items to be stacked and packed on transport to reduce the number of vehicles and the related transport impacts.
- Minimizing plastic by lightweighting packaging items while ensuring durability and safety, and using the same packaging item for multiple menu items.
- Optimizing recyclability.
- Optimizing for efficient washing processes.
- Designs to prevent scratches and extend useful life.
- Managing higher production costs (in comparison to single-use), as there can be a financial impact when items are not returned.

# Advancing Recycling of Guest Packaging

**We have a long history of taking action to prevent litter in our communities through engagement with government, recycling companies and customers. Additionally, we’re collaborating with companies and nonprofit organizations to support the development and expansion of recycling.**

We aim to implement global and local solutions across our business to advance the reduction, reuse, composting and/or recycling of guest packaging, and help create demand for recycled materials by the end of 2025. In 2024, 89.6% of restaurants in markets with advanced infrastructure<sup>14</sup> offered guests the opportunity to recycle and/or compost packaging items, with customer-facing bins for back-of-house or off-site sorting. This is then managed using existing local waste infrastructure systems.

McDonald’s is seeking to make the process as easy as possible for customers in restaurants by using signage indicating which bins are for recycling and which are for general waste. McDonald’s restaurants are working in partnership – including with local recyclers or through national schemes – to maximize recycling of fiber packaging.

Because food-grade recycled material is in limited supply, we are focusing on sourcing recycled materials for paper bags, napkins and cup carriers first. Depending on location around the world, recycled materials are also currently used in some hot beverage cups, cup sleeves, cartons, fry boxes, and plastic beverage and dessert cups, as well as select plastic lids. We are collaborating with industry organizations and other brands to help leverage scale and create demand for food-safe, post-consumer recycled materials.

## Recycling Infrastructure

The availability of recycling infrastructure is important for both single-use and reusable packaging systems. If reusable items are not returned or reach their end-of-life due to damage, it’s important that they can be recycled, which is why our packaging is designed for recyclability.

Paper and cardboard packaging had the highest recycling rate for packaging in the EU (EU-27) in 2022, at 83.2%, whereas the recycling rate of plastic packaging in the EU averaged just above 40% in 2022 ([Eurostat 2024](#)).

In Europe (where the analysis of restaurants with reusable packaging is focused), recycling infrastructure is often significantly more developed than reuse infrastructure (such as return systems and points), but there is important regional variation within recycling capabilities.

To drive circularity, businesses and governments have an opportunity to improve infrastructure and strengthen recycling rates, encouraging recycling both at home and on-the-go in public spaces. There has been significant investment and progress over time. For example, over the last decade, the municipal waste recycling rate in the EU has grown by more than 10% ([European Environment Agency](#)).

<sup>14</sup> Markets with advanced infrastructure: Mature waste and recycling infrastructure at a national level that has (1) a recycling infrastructure network across the entire market, (2) multiple materials being recycled within this national infrastructure network, (3) existing legislation on recycling and (4) high customer awareness of waste and recycling. At the end of 2024, that included 21 markets where McDonald’s operates. 18 of these markets are in continental Europe.



Foodservice waste can be contaminated with food, which can make it more challenging to recycle. Recyclers often prefer high-quality, easy-to-recycle waste (such as corrugated boxes), and the cost of collecting and processing food packaging can mean that even if our packaging is recyclable, sometimes recyclers choose not to recycle it. Where recycling infrastructure exists, such as in Europe, McDonald's is supportive of legislation that requires recyclers to accept and recycle packaging.

McDonald's is a member of 4evergreen, a cross-industry alliance of over 100 members representing the entire life cycle of fiber-based packaging – from forests to producers, designers, brand owners and recyclers. 4evergreen shares expertise to develop tools and guidelines to advance recycling and accelerate the development of new technologies to tackle sorting and recycling challenges. 4evergreen has a goal to reach a 90% recycling rate for fiber-based packaging by 2030.

# Recycling Case Studies

## Pre-Treatment to Address Contamination

As of December 2024, 438 of McDonald's restaurants in Poland operate within a closed waste management system. Since 2020, McDonald's Poland has worked with paper recycler Miklan-Ryza on the development and implementation of proprietary technology to be able to fully recycle food-contaminated paper packaging along with polyethylene-lined paper cups.

Through restaurant communications and educational campaigns, McDonald's Poland encourages customers to sort their packaging waste into three fractions in the restaurant: paper, plastic and mixed waste. Restaurant crew compresses the appropriate paper fractions into a mixed bale of fiber-based packaging, including bags, clamshells and cups, which is then collected by the recycler. Today, 95% of fiber-based packaging that is used by McDonald's restaurant customers in Poland can be recycled by Miklan-Ryza technology. Recovered paper is then sold back to our restaurants as toilet paper, paper towels and cup carriers.

McDonald's Poland plans to finalize the expansion of sorting bins to all restaurant parking lots to help ensure packaging thrown away near restaurants is also collected for recycling. The business is engaging with the government, local municipalities and other brands to identify opportunities to scale this system and technology. In partnership with Miklan-Ryza, McDonald's Poland is working on the development of other products using the recycled fiber from this process.



Example of packaging bale



### Sorting and Separation

In Germany, we estimate that around 92% of fiber-based packaging waste collected in restaurants is recycled.

Waste separation by customers began in 2023. Prior to that, restaurant crew separated customers' packaging waste in a dedicated back-of-house sorting room (this is still the practice in some restaurants pending a changeover in the coming years).

Some recyclable fractions, such as cardboard boxes<sup>15</sup> and cups, are collected through reverse logistics, making use of empty truck space to store these items at distribution centers for collection by dedicated waste handlers. Since April 2019, McDonald's Germany has been collecting beverage cups from McDonald's restaurants and recycling them into sanitary and printable paper (used for Happy Meal books or the McDonald's Germany sustainability report, among other things).

Other recyclables are collected by waste management vendors and recycled as part of larger waste streams.

### Acceptance in Paper Recycling Streams

In Italy, McDonald's has worked with the national producer-responsibility organization for paper Comieco (National Consortium for the Recovery and Recycling of Cellulose-based Packaging) to certify that McDonald's packaging can enter the paper recycling stream and be effectively recycled together with other paper waste volumes. This includes fiber cups laminated with a double layer of polyethylene for which standard paper mill recycling is feasible. Comieco is responsible for the paper and cardboard waste from collection until the point at which it is recycled at a recycling facility.

Comieco collects fiber waste from McDonald's restaurants through municipal waste management companies. Where their services are not available – such as in industrial areas – the restaurants contract with local waste management companies. Once sorted, the recovered materials are sold to paper mills and other recycling facilities for further processing and production of recycled paper and cardboard products.

Thanks to this system, a collaboration between McDonald's Italy, restaurant operators, consumers and waste collection companies, the waste collected and separated in lobbies for recycling can amount to over 80% of the paper products used (e.g., napkins and cutlery) and 90% of paper guest packaging.

### Advancing Paper Cup Recycling

McDonald's is a founding partner of The Cup Collective, which aims to expand the recycling of paper cups and other fiber packaging across Europe. The program includes representation from across the value chain, including pulp, paper and board manufacturers, packaging producers, converters and distributors, food and beverage retailers, brand owners, waste management providers and recyclers.

The Cup Collective has delivered city activations in Belgium (Brussels) and Ireland (Dublin), where paper cups have been collected from McDonald's and other participating stores, as well as busy public spaces, such as major transport hubs and shopping centers. The initiative in Ireland enabled the collection and recycling of 2 metric tons of paper cups from public spaces in a 12-month period. There were an additional 9 metric tons of material collected for recycling through McDonald's restaurants in Ireland.

In the Netherlands, The Cup Collective enabled the recycling of 95 metric tons of paper cups in the 12-month period from April 2024. The activations demonstrated that paper cups can be collected from consumers in a format that enables recycling as a source-segregated material stream at European standard, de-inking and specialist paper mills.

15 Cardboard boxes are back-of-house packaging rather than primary guest packaging.



## Scope of the Analysis

**When analyzing the impacts of reusable packaging, we considered each process step in the life cycle of the packaging. The life cycle of reusable packaging is different from single-use packaging due to the washing of packaging, customer transport to return used packaging back to restaurants, transport to and from off-site washing facilities and different end-of-life disposal methods.**



# Measuring Impacts at Each Stage of the Process

**Environmental impacts** were modeled for all process steps in the life cycle of single-use and reusable guest packaging. We focus on the following metrics in the environmental impact analysis:

- Plastic waste and fiber waste produced (based on packaging volumes and weights).<sup>16</sup>
- GHG emissions.<sup>17</sup>
- Water consumption (the portion of water not returned to source after being withdrawn).

**Financial impacts** were also modeled for all process steps in the life cycle and covered:

- Initial investment costs for implementing reusables at a restaurant level.
- A comparison of the ongoing operational costs between reusables and single-use packaging.

While financial impacts are discussed in this report, no financial data is disclosed.

**Operational insights** were collected and are discussed in the report, based on McDonald’s experience.

<sup>16</sup> Modeled on packaging volumes and weights. While some of this material waste is expected to be recycled, this has not been deducted from the volumes modeled.  
<sup>17</sup> This analysis utilized independent modeling and does not rely on the emissions factors leveraged in McDonald’s annual GHG inventory. As such, the findings are not directly applicable to understanding progress against McDonald’s public climate target.

| Process              |  Implementation of reusable packaging model |  Production                                                                                                                                   |  Restaurant usage |  Reuse operations                                                |  End-of-life |
|----------------------|--------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|
|                      | Remodeling of restaurants for washing, purchasing equipment and restaurant crew and customer education.                        | Manufacturing of packaging and transport of packaging items to the restaurant. This includes production of the initial stock of reusables, as well as ongoing stock replenishment of reusable items that have not been returned. | Food preparation and serving food to customers.                                                      | Return of reusable items by the customer and washing and drying reusables on-site or off-site (including transport to and from washing facilities). | End-of-life management (e.g., recycling).                                                       |
| Reusable packaging   | <div><div></div><div>✓</div></div>                                                                                             | <div><div></div><div>✓</div></div>                                                                                                                                                                                               | <div><div></div><div>✓</div></div>                                                                   | <div><div></div><div>✓</div></div>                                                                                                                  | <div><div></div><div>✓</div></div>                                                              |
| Single-use packaging | <div><div></div><div></div></div>                                                                                              | <div><div></div><div>✓</div></div>                                                                                                                                                                                               | <div><div></div><div>✓</div></div>                                                                   | <div><div></div><div></div></div>                                                                                                                   | <div><div></div><div>✓</div></div>                                                              |



# Packaging Scenarios

The analysis focused on modeling four scenarios where varying reusable packaging requirements are implemented in a McDonald’s restaurant, in comparison to a scenario where all McDonald’s packaging is single-use.

Three of these scenarios represent different reusable packaging systems that have been implemented across restaurants in response to national requirements in France, Germany and the Netherlands. The scope of the scenarios is based on requirements and the status of implementation as of January 2024 to the end of June 2024. The fourth scenario is based on the reusable packaging requirements under the EU PPWR.

-  Where **dine-in** is referenced, this means primary guest packaging used for orders that are prepared, served and consumed within the restaurant premises.
-  Where **takeout** is referenced, this means primary guest packaging used for orders that are prepared and sold for immediate consumption off-site.

**Single-use scenario:** All packaging items are single-use and primarily fiber-based – based on McDonald’s existing single-use packaging portfolio in Europe.

**Scenario A (France):** National law makes reusable packaging mandatory for dine-in but not for takeout. Fiber wraps are permitted for all sandwiches and burgers. The reusable packaging used is a mix of Tritan™ and polypropylene packaging.

**Scenario B (the Netherlands):** Dine-in drinks and the McFlurry are served in reusable cups.<sup>18</sup> Single-use packaging is used for all other items. For takeout, customers can choose a reusable cup (with a €1 deposit return scheme, which can be returned to any McDonald’s restaurant in the Netherlands) or a single-use cup. Around 4% of menu items sold for takeout were in reusable packaging between January and June 2024, based on customers choosing reuse.

**Scenario C (Germany):** Customers can choose single-use cups or reusable cups<sup>19</sup> for drinks, the McFlurry and the sundae. This offer is for both dine-in and takeout, with a €2 deposit return scheme. Reusables can be returned to any McDonald’s restaurant across Germany. Single-use packaging is used for all other items. Less than 1% of menu items sold (across dine-in and takeout) were in reusable packaging between January and June 2024, based on customers choosing reuse. This is despite the offer being available nationally for over two years.

**Scenario 2030:** To estimate the potential impact of the EU PPWR requirement to offer reusable packaging for takeout, the analysis models the effects of using reusable packaging for 10% of menu items sold for takeout.<sup>20</sup> For the purposes of the modeling, each single-use item is replaced by an equivalent reusable item. For example, for every 100 drinks served for takeout, 10% are in reusable cups and 90% are in single-use cups.

We assume that 80% of washing is completed on-site and 20% in off-site washing facilities to reflect that not all restaurants may be able to install washing and drying equipment.

18 In the Netherlands, fiber lids are served with reusable cups, as allowed by national legislation.  
19 In Germany, reusable cups are served with reusable lids to meet legislative requirements.  
20 In the 2030 analysis, updates have been made to both the Single-use scenario and the Scenario 2030 to reflect changes to end-of-life impacts, vehicle electrification and the energy grid. Read more details on End-of-Life and Data Sources and Supporting Assumptions on pages 37–38.



Overview of Key Differences in Each Scenario

|                          |                                              | Scenarios                                |                                                                                         |                                                                                     |                                                                                        |                                                             |
|--------------------------|----------------------------------------------|------------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|-------------------------------------------------------------|
|                          |                                              | Single-use                               | A (France)                                                                              | B (Netherlands)                                                                     | C (Germany)                                                                            | 2030                                                        |
| Packaging mix            | Dine-in                                      | Single-use fiber packaging <sup>21</sup> | Reusable items for drinks and food except for sandwiches/burgers served in a fiber wrap | Reusable cups without lids<br><br>Single-use fiber for all other items              | Reusable cups with reusable lids<br><br>Single-use fiber packaging for all other items | Single-use fiber packaging                                  |
|                          | Takeout                                      | Single-use fiber packaging               | Single-use fiber packaging                                                              | Reusable cups with fiber lids<br><br>Single-use fiber packaging for all other items | Same as dine-in                                                                        | 10% reusable items and 90% single-use fiber packaging items |
| Reusables Mode           | Dine-in                                      | N/A                                      | Mandatory                                                                               | Mandatory                                                                           | On-demand                                                                              | N/A                                                         |
|                          | Takeout                                      | N/A                                      | N/A                                                                                     | On-demand                                                                           | On-demand                                                                              | On-demand: 10% of takeout                                   |
| Packaging considerations | Reusables polymer material                   | N/A                                      | Tritan™ and polypropylene                                                               | Polypropylene                                                                       | Polypropylene                                                                          | Polypropylene                                               |
|                          | Wrap or clamshell for sandwiches and burgers | Fiber clamshells <sup>22</sup>           | Fiber wraps                                                                             | Fiber clamshells                                                                    | Fiber clamshells                                                                       | Reusable clamshell for 10% of takeout only                  |

Understanding What Drives Differences in Results

Impact measurement is based on actual data from McDonald’s and suppliers, with additional data from external sources used to fill any relevant gaps. Some data is based on regional averages, such as energy grid emissions factors, which are based on an EU average.

To allow comparability across the scenarios, a consistent number of menu items sold for dine-in and takeout per restaurant, over a 12-month period, was applied to each scenario. We applied a consistent split of around 30% of menu items sold for dine-in and around 70% for takeout for each scenario. We also applied an average composition and weight of McDonald’s single-use guest packaging items.

- The results between scenarios vary dependent on the following inputs, rather than variations in sales:
- Packaging mix (reusable and single-use).
  - Observed average number of uses of reusable packaging.
  - Observed percentage of customers choosing reusable packaging for optional items.
  - Operational data such as washing and transport distances and practices.
  - End-of-life assumptions (e.g., recycling rates).

21 Packaging is primarily fiber. Some single-use packaging items (e.g., cups) include a plastic lining.

22 While McDonald’s restaurants use a mix of both fiber wraps and fiber clamshells for burgers, for the purposes of this study we have assumed that orders use fiber clamshells only in the Single-use scenario. These clamshells are heavier than wraps and result in larger impacts than wraps.

# Achieving a Sufficiently High Number of Uses

For reusable packaging to achieve a lower environmental impact than single-use packaging, it depends on achieving a sufficiently high number of uses, or complete “reuse loops,” before an item reaches its end-of-life. Transportation is included at varying steps of the loop.

The number of uses (or reuse rate) achieved is impacted by items that are not returned (losses), as well as items that may be returned but not reused due to damage.

Preliminary data suggests that losses are mainly caused by:

- 1. Customers removing dine-in only items from the restaurant.
- 2. Disposal of items into the waste bin rather than a collection unit.
- 3. Takeout customers not returning items, even when a deposit system is in place.

These reasons are closely linked to customer behavior, which is outside of a restaurant’s control. However, efforts can be made (such as providing instructional signage and educational materials) to help reduce occurrences.

To effectively measure reuse systems, we therefore measure and report on the average number of uses.

## Calculating the Average Number of Uses

The average number of uses for McDonald’s reusable packaging is calculated by comparing the number of replacement items procured by a McDonald’s restaurant over a certain period and the number of items served over the same period, or by comparing the number of items sold in reusables and the number of items allocated to be washed.

The number of uses observed between January 2024 and end of June 2024 are detailed in the table below. The number of uses vary by packaging item but the numbers in this report are averages across all items.

McDonald’s experience and data indicates that smaller packaging items, such as espresso cups, cutlery and sundae cups, have a higher risk of not being returned by customers.

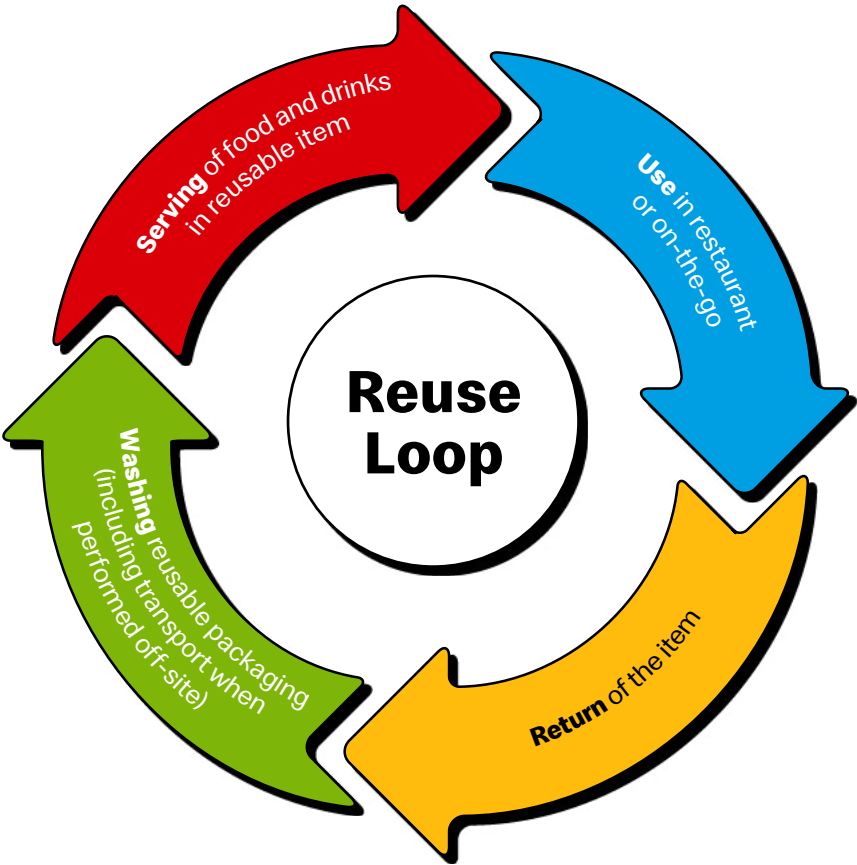
For dine-in, where reusable packaging items are not intended to leave the restaurant, a higher number of uses have been achieved relative to takeout. For takeout, the average number of uses achieved is very low, due to a low number of customers returning the reusables. In Scenario C, all reusable items require a deposit and can leave the restaurant, so the number of uses is consistent across dine-in and takeout orders.

## Estimating the Average Number of Uses for Scenario 2030

The average number of uses (2.6 uses) achieved in Scenario C (Germany), between January and June 2024, is used as a representation of potential reuse rates across EU countries for Scenario 2030, which requires restaurants to offer customers the option of reusable packaging for takeout. Germany’s reuse offer for dine-in and takeout has been in place since 2022 and can therefore mirror the two-year period between 2028 and 2030, when McDonald’s EU-based restaurants are required (under PPWR) to offer reusable packaging for takeout.

Observed average number of uses per item from January to end of June 2024 for Scenarios A, B and C. Estimated average number of uses for Scenario 2030.

|         | Scenario A   | Scenario B | Scenario C | Scenario 2030  |
|---------|--------------|------------|------------|----------------|
| Dine-in | 33.9         | 3.4        | 2.6        | No reusables   |
| Takeout | No reusables | 1.5        | 2.6        | 2.6 (estimate) |





# Recycling Rate Assumptions

The recycling rate of our packaging, defined as the share of packaging collected and entering the recycling process at a recycling facility, varies by geography and depends on whether the packaging is disposed of in the restaurant, at home or on-the-go. Both national and municipal decisions can create geographical differences, often resulting in a patchwork of systems. Disposal location also influences the level of control we have over the end-of-life of our guest packaging.

The environmental analysis of the scenarios has deliberately been cautious on assumed recycling rates so as not to overstate the case for single-use packaging. McDonald's worked with PwC to determine assumptions for average EU recycling rates for the analysis. Each scenario modeled uses the same end-of-life assumptions, rather than country-specific rates or McDonald's-specific results in that country. It assumed 80% of fiber-based guest packaging waste for dine-in will be disposed of in the restaurant and estimated that 46% is recycled. However, the rates are higher for McDonald's restaurants in some European countries, as demonstrated by the case studies on [pages 13–14](#). For example, in Germany, we estimate that around 92% of fiber-based packaging waste collected in restaurants is recycled.

The analysis assumed that all guest packaging waste for takeout will be disposed of at home (25%) or on-the-go (75%) rather than in McDonald's restaurants. While there are overall high recycling rates for paper and cardboard packaging (covering a range of sectors) within the EU (83%), it is difficult to measure takeout recycling rates for our food packaging, which is why the analysis cautiously assumed no recycling of paper packaging on-the-go and low rates at home. As such, it assumed a cautious 3% overall paper recycling rate for waste from takeout, but the rate could well be higher.

For plastic, the overall assumed recycling rate is 23% for waste from takeout, as we assume a higher proportion of plastic reusable items may be taken home versus disposed of on-the-go. See end-of-life assumptions on [page 37](#) and supporting assumptions on [pages 38–42](#).

## Understanding the Impact of Recycling Rates on the Results

The assumed recycling rates used in the analysis can influence the results. A higher recycling rate can reduce the GHG emissions associated with single-use fiber-based packaging. For example, if the assumed recycling rate for fiber-based packaging waste from dine-in increased from 46% to 80%, this would lead to an 11% reduction in GHG emissions in the Single-use scenario. Similarly, if the recycling rate for takeout increased from 3% to 30%, this would lead to an 8% reduction in GHG emissions in the Single-use scenario. This underpins the importance of partnering to advance recycling infrastructure and collection processes.

Emissions impacts of single-use packaging would be lower than the Single-use scenario modeled, where actual recycling rates are higher than the 46% EU-average assumption, such as the 92% fiber recycling rate for dine-in packaging in McDonald's Germany.

The use of recycled content in packaging materials also influences the impacts from packaging production. The greater the use of recycled materials, the lower the impacts from production. This underpins the importance of partnering to advance recycling infrastructure and collection processes.

8%

reduction in GHG emissions per restaurant can be achieved in the Single-use scenario, if the assumed recycling rate for fiber-based packaging waste from takeout increased from 3% to 30%

11%

reduction in GHG emissions per restaurant can be achieved in the Single-use scenario, if the assumed recycling rate for fiber-based packaging waste from dine-in increased from 46% to 80%

# Limitations

## Grid Decarbonization

Due to limitations in the data, emission reductions associated with grid decarbonization could only be applied to energy use for washing reusables and electric vehicle use for transport in the 2030 analysis.

Calculating the potential change in emissions from a low-carbon grid for raw material production was not possible with the data available. As a result, the 2030 analysis does not include potential emissions savings from energy grid decarbonization related to energy use in the production, converting and end-of-life processing of fiber or plastic packaging materials.

## Consumer Journeys and At-Home Washing

Additional consumer journeys, which would be taken to return packaging to McDonald's, and customers washing takeout packaging at home before returning it to a restaurant are not considered by the model.

## Chemical Production and Wastewater Treatment

This modeling does not include energy or water consumption impacts from the production of detergents used to wash reusable packaging. It also does not include impacts from the wastewater treatment facilities, when water used in the washing process is returned for treatment and use.



## Environmental Impact

**Overall, the analysis highlights that reusable packaging does not achieve an overall positive impact compared to single-use packaging across the impact areas measured and the four scenarios modeled. The relative environmental impact of reusable packaging as compared to single-use fiber-based packaging is highly dependent on a range of factors and assumptions. These include the achieved reuse rate of reusable packaging, packaging items in-scope, packaging size and weight, whether washing of reusable packaging is done on-site or off-site, and the material used for the packaging.**

**The analysis and results provide an estimated impact of reusable packaging in the identified scenarios, rather than a reflection of the results of a specific restaurant in a specific country. Country-specific data, such as recycling rates and energy grid mix, would be needed to understand country-specific outcomes.**



# Plastic Waste and Fiber Waste

McDonald's is working to accelerate solutions that help reduce waste, while transitioning to more sustainable packaging materials that meet requirements for hygiene, food safety, quality and functionality for all service channels.

McDonald's is transitioning away from virgin fossil fuel-based plastics in single-use packaging, including reducing small plastic primary guest packaging that is hard to recycle and exploring innovations that promote alternatives to plastic, including renewable and certified fiber.

The results highlight that when reusables are offered for takeout and dine-in, plastic waste from guest packaging increases, while fiber waste decreases. This is due to the shift from fiber-based single-use packaging to entirely plastic reusable packaging.<sup>23</sup>

The progress made by McDonald's to minimize the amount of plastic used in our single-use packaging means that more than 100 uses of reusable packaging are needed to achieve a breakeven on plastic waste under the 2030 scenario.

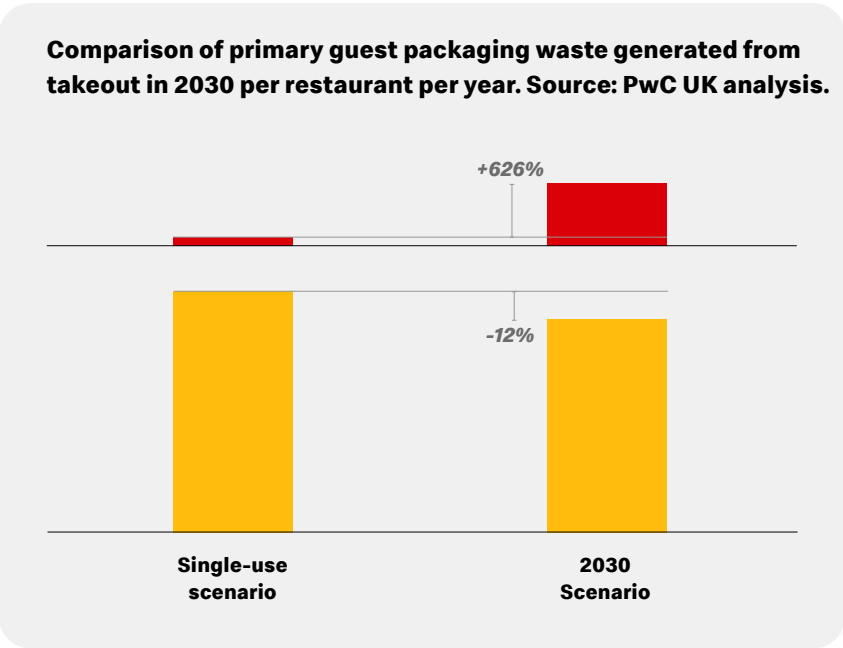
626%

increase in plastic waste from guest packaging per restaurant per year under Scenario 2030



## Takeout in 2030

Under Scenario 2030, when 10% of menu items sold for takeout are in reusable packaging (with each single-use item replaced with a reusable item), plastic waste from guest packaging increases more than six times (626% per restaurant per year), while fiber waste decreases by 12% per restaurant per year. This significant increase in plastic waste is due to a low number of reuses (2.6 is estimated, which is the actual rate achieved in Germany after a two-year period of offering reusables).



Key: ● Total plastic waste  
● Total fiber waste

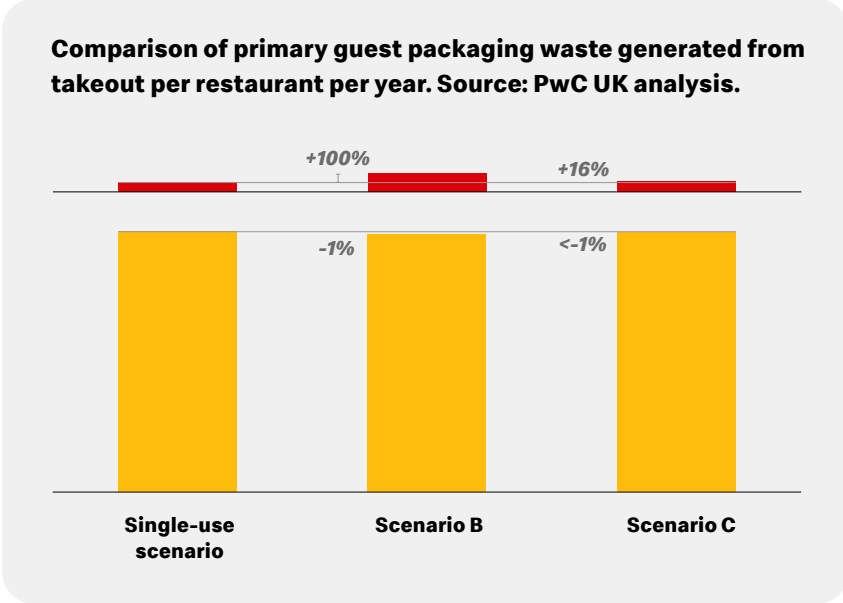


## Takeout

A low number of reuses achieved for takeout cups resulted in plastic waste from guest packaging increasing when using reusables compared to single-use packaging. Due to the very low volume of customers choosing reusables, there was a minimal decrease in fiber waste.

For Scenario B, plastic waste went up by 100%, while fiber waste went down by 1%. For Scenario C, reusable cups led to a 16% increase in plastic waste, and there was a negligible impact on fiber waste due to a low number of guests choosing reusable cups (0.9% of menu items sold).

If the volume of guests choosing reusables in both scenarios increased but the average number of uses remained the same, there would be an even greater increase in plastic waste.



23 Plastic used for reusable packaging does not contain recycled or renewable plastic.



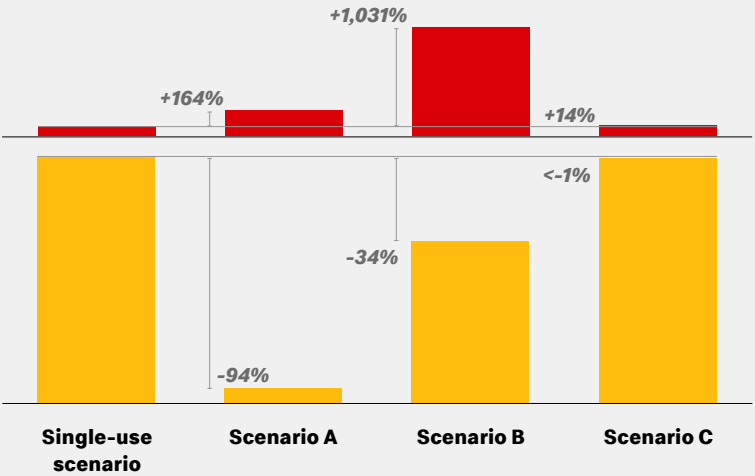
Dine-In

When reusable packaging items are used for dine-in, plastic waste from guest packaging increases while fiber waste decreases. As noted previously, this is because single-use packaging is currently fiber-based, while reusable packaging is entirely plastic.

In Scenario A, plastic waste from guest packaging goes up by 164%, while fiber waste goes down (94%). For Scenario B, plastic waste goes up by 1,031%, while fiber waste goes down by 34%.

Very low customer uptake rates for reusable packaging in Scenario C means a 14% increase in plastic waste but a negligible impact on fiber waste volumes.

Comparison of primary guest packaging waste generated from dine-in per restaurant per year. Source: PwC UK analysis.



Key: ● Total plastic waste  
● Total fiber waste

Greenhouse Gas Emissions

**McDonald’s believes that reducing emissions and adapting to climate change is critical to helping improve the resilience of the McDonald’s System. We work toward our climate action ambitions by focusing on reducing emissions in our restaurant operations and engaging our suppliers to do the same in supply chains, strengthening our business resilience and using our voice to advocate for collective transformation.**

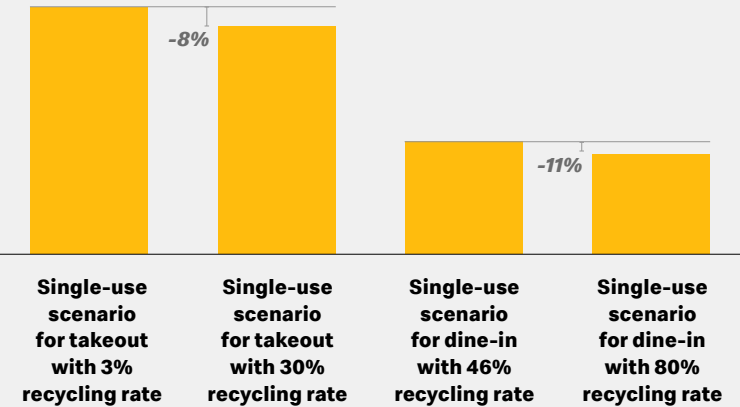
GHG emissions associated with packaging are linked to production, transport (to restaurants, to end-of-life and to washing facilities as needed), energy use for washing reusables and end-of-life. The analysis showed that per-item GHG emissions associated with packaging production are higher for reusable plastic items compared to fiber-based single-use items, which means a sufficiently high number of reuses needs to be achieved to offset the emissions from production. Any potential reduction in total emissions compared to single-use packaging is limited because the process of washing the reusable items generates additional emissions.

The results on the following pages highlight how GHG emissions associated with guest packaging typically increase where reusables are offered for takeout and dine-in, including under Scenario 2030. The analysis also shows that the scale of impact can vary, depending on which single-use packaging items are switched for reusables. In Scenario A, if paper wraps (used for sandwiches and burgers) were replaced with reusable containers, GHG emissions would increase by 30% per restaurant.

The assumed recycling rates used in the analysis also influence the impact on GHG emissions. All scenarios are modeled against a Single-use scenario with an assumed recycling rate for fiber-based packaging of 46% for dine-in and 3% for takeout. A higher recycling rate can reduce the GHG emissions associated with single-use fiber-based packaging, which is an important aspect of McDonald’s packaging strategy. If the recycling rate increased to 80% for dine-in and 30% for takeout, this would lead to an 11% reduction in GHG emissions for dine-in and an 8% reduction for takeout in the Single-use scenario.

The analysis uses EU averages for recycling rates and energy grid mix. Country-specific data would be needed to understand country-specific outcomes and would impact the results.

GHG emissions reductions for the Single-use scenario from higher fiber recycling rates. Source: PwC UK analysis.



Key: ● Total GHG emissions



### Emissions Breakdown

The charts show the overall percentage change in GHG emissions in a reusable scenario versus the Single-use scenario. As we are measuring scenarios where reusable packaging has recently been introduced, the charts for Scenarios A, B and C include the GHG emissions impact from the production of the initial stock of reusables required, as well as the production impact of ongoing stock replenishment (such as replacing reusable items that have not been returned). The GHG emissions from the initial production of stock would be a one-off impact. We have not included the production impact of the initial stock of reusables for Scenario 2030, as it assumes the reuse system has been in place for two years.

- Key:**
- Production – Initial stock (only included for Scenarios A, B and C)
  - Production – Ongoing stock replenishment
  - Transport to restaurant
  - Energy for washing and transport for reuse
  - End-of-life (EOL)/recycling including transport

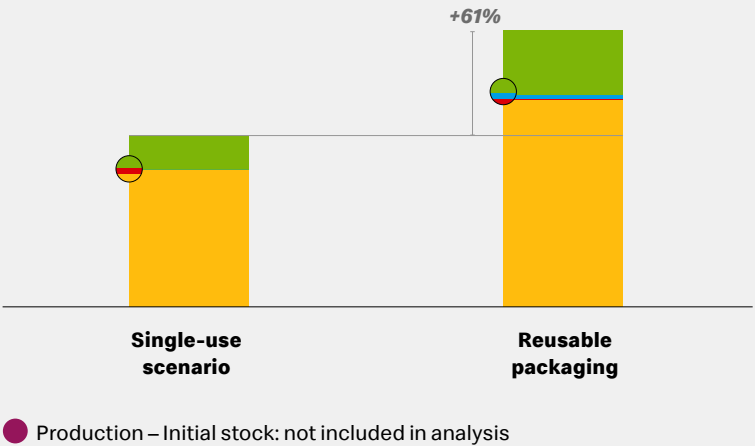


### Takeout in 2030

When 10% of menu items sold for takeout are in reusable packaging, total GHG emissions associated with guest packaging increase by 61% per restaurant per year. This is primarily driven by an increase in emissions associated with the production of plastic reusable packaging and the average number of uses not being high enough to offset these emissions (2.6 uses – based on the actual rate achieved in Germany where reusables were offered over a two-year period).

The higher volume of guests choosing reusable packaging (10%) in 2030 drives high GHG emissions associated with plastic incineration at end-of-life. The washing process also adds emissions – albeit not significantly, due to the low volume of items returned for washing. If the average number of reuses increased, emissions associated with production would fall, but emissions associated with washing would go up.

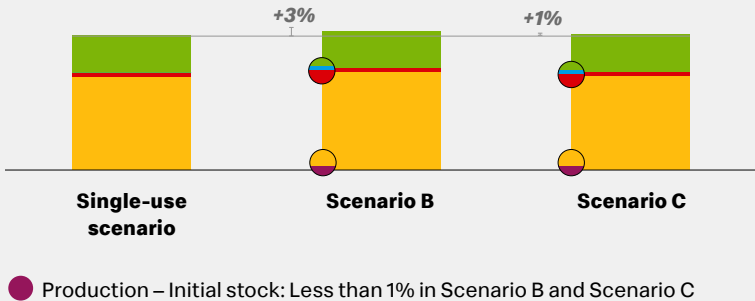
Comparison of GHG emissions associated with primary guest packaging from takeout in 2030 per restaurant per year. Source: PwC UK analysis.



### Takeout

GHG emissions associated with guest packaging increase where reusables are offered for takeout compared to the Single-use scenario. This is because per-item GHG emissions associated with packaging production are higher for reusable plastic items compared to fiber-based single-use items. A low number of uses observed means that these production impacts are not offset, as new reusable items need to be produced to replace lost items, which have not been returned by customers.

Comparison of GHG emissions associated with primary guest packaging from takeout per restaurant per year. Source: PwC UK analysis.



Under Scenarios B and C, emissions increase by 3% and 1% respectively. These increases are low due to the very low customer uptake rates (4% of menu items sold in Scenario B and 0.9% in Scenario C). If customer uptake was higher (greater volumes of reusables used) but the average number of uses remained the same, there would be a greater increase in emissions per restaurant.



Dine-In

When offering reusable packaging for dine-in, the results for total GHG emissions vary depending on the achieved average number of uses.

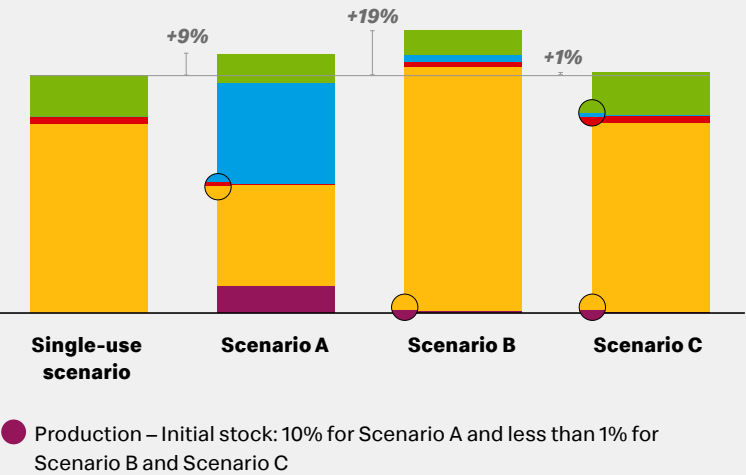
Total GHG emissions are 9% higher under Scenario A compared to the Single-use scenario (when including the production impacts of the initial batch of stock) and are expected to only be 3% lower in the following years (when production impacts are only associated with replenishment of stock). This is based on restaurants achieving an average of 33.9 uses.

Under Scenario B, the use of reusable cups for dine-in increases GHG emissions by 19%. The observed average number of uses (3.4 uses) is lower than the number needed to allow the higher GHG emissions per reusable packaging item to be offset by the number of uses.

Under Scenario C, where the number of customers choosing reusables is low, the results show a small 1% increase in GHG emissions. If a greater volume of customers chose reusables but the average number of uses remained the same (due to low returns), there would be a higher increase in GHG emissions.

A key factor that would further influence the results is the assumed recycling rate. The analysis assumed a cautious recycling rate of 46% for fiber packaging for dine-in. If this increased to 80% (which is the situation in McDonald's restaurants in a number of countries (see examples on pages 13-14)), GHG emissions in the Single-use scenario would be 11% lower, demonstrating that an increase in recycling fiber-based packaging can outperform a shift to reusables.

Comparison of GHG emissions associated with primary guest packaging from dine-in per restaurant per year. Source: PwC UK analysis.



19%

increase in GHG emissions per restaurant under Scenario B, compared to the Single-use scenario

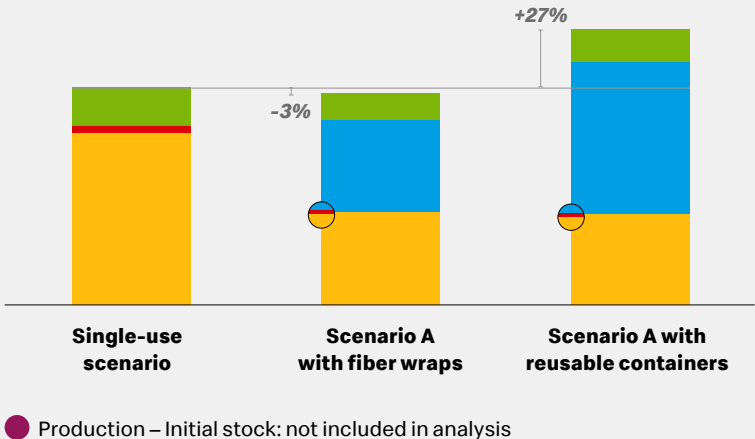
30%

increase in GHG emissions per restaurant if paper wraps (for sandwiches and burgers) were replaced with reusable containers under Scenario A

Comparison of Fiber Wraps to Reusable Containers

The analysis shows the type of single-use packaging items that are replaced by reusable packaging can significantly impact the results. Scenario A includes the use of paper wraps for all sandwiches and burgers. If paper wraps were replaced with reusable packaging (meaning that reusable packaging was provided for all menu items, including sandwiches and burgers), GHG emissions would be 27% higher than the Single-use scenario. This is a 30% increase in GHG emissions per restaurant due to switching from paper wraps to reusable containers.

Comparison of GHG emissions associated with primary guest packaging from dine-in with single-use fiber wraps or reusable containers, per restaurant per year. Source: PwC UK analysis.





# Water Consumption

**McDonald’s is working to conserve water, use it responsibly and efficiently and further build resiliency within the McDonald’s System.**

The analysis focuses on measuring “water consumption,” which is defined as the use of water that is not returned to the same local water source. This is intended to give a better indication of the long-term environmental impact and water resource depletion than “water withdrawal.”

In this analysis, water consumption impacts do not include water used directly in the washing process (whether that be in a restaurant or off-site washing facility), as it assumes most of that water is returned to the local water source after being processed at local water treatment plants. Small volumes of water are expected to be lost due to evaporation during the drying process, but this was not factored into the analysis.

Overall, water consumption for takeout in the 2030 Scenario increases compared to the Single-use scenario, but the results show varying reductions for takeout and dine-in for Scenarios A, B and C.

The analysis showed that water consumption associated with guest packaging production can decrease when introducing plastic reusables, principally due to renewable fiber packaging production consuming more water than plastic packaging production. However, additional water consumption is required for the washing process for reusables – with water consumed in the generation of the energy to power the dishwashers. Water consumption impacts from the production of detergents for washing reusables and the wastewater treatment process were also not included in the analysis. This is a limitation to the analysis as these impacts would increase water consumption impacts across Scenarios A, B, C and Scenario 2030 if included.

A broader assessment of water consumption impacts of reusable packaging in the food service industry, including the impact of detergents and wastewater treatment, can be found in the [in-store and takeaway life cycle assessments](#) (LCA), which were commissioned by the European Paper Packaging Alliance and carried out by independent consultant Ramboll. These LCAs meet ISO 14040 and 14044 standards and were third-party verified.

While the modeling measures water consumption, water use and location are also important considerations. Implementation of reusable packaging relocates water use from a small number of mainly Scandinavian fiber production locations (where fiber packaging is sourced and produced for McDonald’s in Europe) to countries and local water sources where restaurants are located, including more water-scarce regions, such as locations in Southern Europe. Just under a third of McDonald’s European restaurants are located in extremely high or high water stress regions.<sup>24</sup>

## Water Consumption Breakdown

The charts show the overall percentage change in water consumption for Scenarios A, B and C versus the Single-use scenario. As we are measuring scenarios where reusable packaging has recently been introduced, the charts for Scenarios A, B and C include the water consumption impact from the production of the initial stock of reusables required, as well as the production impact of ongoing stock replenishment (such as replacing reusable items that have not been returned). The initial production of stock would be a one-off impact. We have not included the production impact of the initial stock of reusables for Scenario 2030, as it assumes the reuse system has been in place for two years.

- Key:**
- Production – Initial stock (only included for Scenarios A, B and C)
  - Production – Ongoing stock replenishment
  - Transport to restaurant
  - Energy production for washing and transport for reuse
  - EOL/recycling including transport

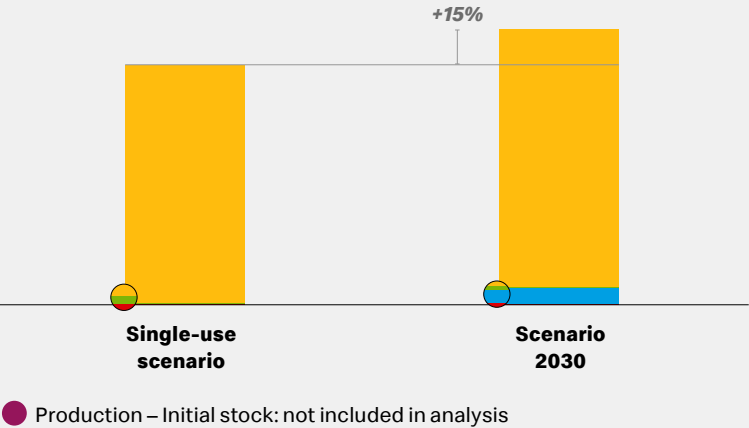
24 According to a McDonald’s assessment, utilizing information from World Resources Institute Aqueduct 4.0. Water stress measures the ratio of total water demand to available renewable surface and groundwater supplies. Extremely high or high indicates substantial competition for water resources.



### Takeout in 2030

When 10% of menu items sold for takeout are in reusable packaging, water consumption associated with guest packaging increases by 15% per restaurant per year compared to the Single-use scenario. This is due to the low average number of uses (2.6 – based on the average number of uses achieved in Germany where reusables were offered over a two-year period), which increases the water consumption associated with production of replacement reusable items, plus the water consumption associated with energy requirements for washing.

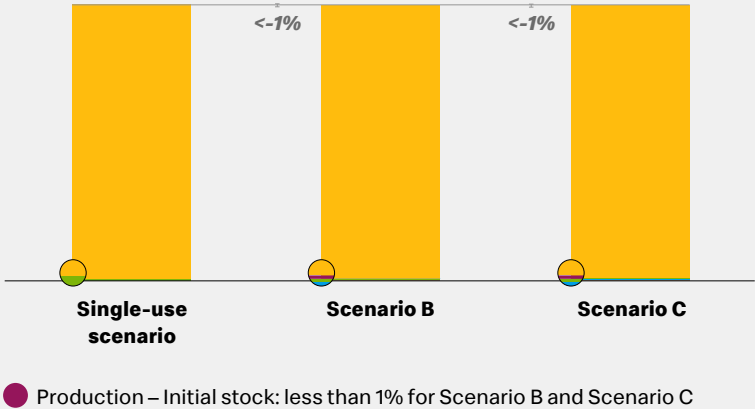
Comparison of water consumption associated with primary guest packaging for takeout in 2030 per restaurant per year. Source: PwC UK analysis.



### Takeout

Where reusable packaging is offered for takeout under Scenarios B and C, the water consumption impacts are almost the same as the Single-use scenario due to a low number of customers choosing reuse (4% and 0.9% of menu items sold, respectively).

Comparison of water consumption associated with primary guest packaging from takeout per restaurant per year. Source: PwC UK analysis.





 **Dine-In**

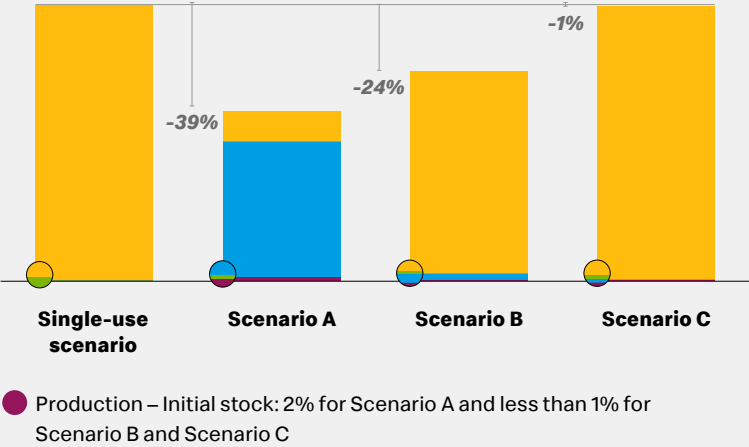
Where reusable packaging is offered for dine-in, water consumption associated with guest packaging reduces compared to the Single-use scenario. This is principally due to production of fiber packaging consuming more water than production of plastic reusable packaging. In Scenario A, water consumption reduces by 39%, and in Scenario B, it reduces by 24%. The water consumption impact in Scenario C is almost the same as the Single-use scenario, due to a low number of customers choosing reusables.

While water consumption reductions occur at the production stage, washing and drying the reusable items requires additional water consumption to produce energy for dishwashers, as demonstrated under Scenario A. The greater the volume of reusable items used instead of single-use items and the higher the reuse rate, the higher the demand for water consumption from energy production. This is demonstrated under Scenario A, which includes reusable packaging for a range of menu items, compared to Scenario B which includes reusable cups only.

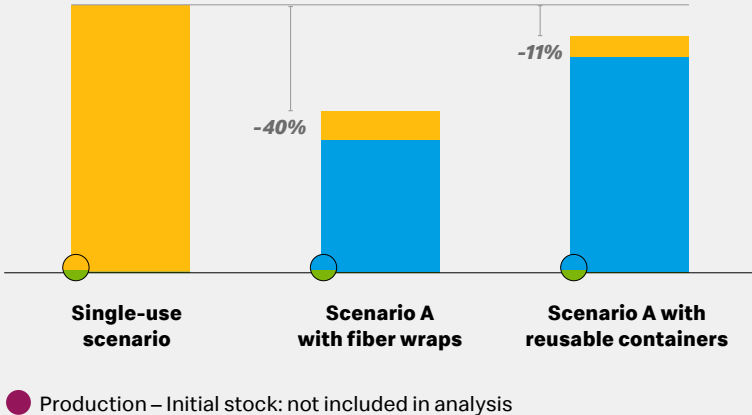
The type of packaging items included can significantly impact the results. Scenario A includes the use of paper wraps for all sandwiches and burgers. If paper wraps were replaced with reusable packaging, this would lead to a 27% increase in water consumption per restaurant per year under Scenario A.

The water consumption is also relocated from the Scandinavian fiber production locations to local energy-generation facilities, which may be in more water-scarce regions.

**Comparison of water consumption associated with guest packaging from dine-in per restaurant per year.**  
**Source: PwC UK analysis.**



**Comparison of water consumption associated with primary guest packaging from dine-in with single-use fiber wraps or reusable containers, per restaurant per year.**  
**Source: PwC UK analysis.**





# Overall Environmental Impact Analysis

## Breakeven Points Across Scenarios A, B and C

Breakeven points are the number of uses a reusable package item must undergo to have comparable or lower environmental impacts compared to a single-use packaging item.

These breakeven points can vary for each scenario and will depend on the boundary of the analysis. Factors that influence the breakeven points include the packaging items in-scope of a scenario and whether they are washed on- or off-site, and the recycling rates or end-of-life assumptions. For example, this analysis does not include water consumption impacts associated with the production of detergents or the wastewater treatment process, which could increase the breakeven point for water consumption. Given these factors and the different scenarios presented, this report provides a range for breakeven points rather than a precise number. This means these are representative of the scenarios as modeled but cannot be applied to a specific packaging item or a specific restaurant in a specific country.

**Breakeven point<sup>25</sup> required for the impacts of reusable packaging to be equivalent to single-use packaging. Source: PwC UK analysis.**

| Impact Factors    | Estimated Average Breakeven Point Range |
|-------------------|-----------------------------------------|
| Plastic waste     | 39–130 uses                             |
| GHG               | 5–33 uses                               |
| Water consumption | 2 uses                                  |

The progress made by McDonald's to reduce the amount of virgin fossil fuel-based plastic used in our single-use packaging means that a significant number of uses of reusable packaging are needed to achieve the breakeven point on plastic waste. As a result, our findings today show that plastic waste is increasing where reusables are introduced.

The breakeven points identified are a helpful starting point for understanding the potential implications of reusable packaging mandates for foodservice restaurants. Specific data on packaging scope, washing process, logistics and the local energy grid, among other factors, would be required to identify the estimated breakeven point in any given scenario.

## Scenario 2030 – Breakeven Points

For Scenario 2030 (when 10% of menu items sold for takeout are in reusable packaging), we determined the following breakeven points. These are representative of the 2030 Scenario as modeled but local and specific data would be required to identify the estimated breakeven point in any given country or scenario.

**Breakeven point required for the impacts of reusable packaging to be equivalent to single-use packaging. Source: PwC UK analysis.**

| Impact Factors    | Estimated Average Breakeven Point |
|-------------------|-----------------------------------|
| Plastic waste     | >100 uses                         |
| GHG               | 18 uses                           |
| Water consumption | 50 uses                           |

We currently assume that each reusable takeout packaging item is reused 2.6 times in Scenario 2030. This figure is based on the observed number of uses in Scenario C (Germany), where reusable cups have been offered as part of a deposit return scheme for customers since 2022.

For all factors, the breakeven point is higher than the modeled average number of uses. This means that Scenario 2030 has greater negative environmental impacts than the Single-use scenario.

It will take more than 100 uses to see plastic waste fall compared to the Single-use scenario, because the single-use packaging is fiber-based, whereas reusables are made entirely from plastic. This would require all reusable items to be returned after takeout.

For GHG emissions, 18 uses are needed to reduce emissions compared to the Single-use scenario; for water consumption, more than 50 uses are required. Achieving this level of reuse, compared to the 2.6 uses observed in 2024, will require a significant increase in customers returning the reusable items.

## Implications of Increasing Customer Demand for Reuse

Scenario 2030 is based on the PPWR requirement to offer customers the option of reusables for takeout and models 10% of menu items sold for takeout being in reusable packaging. When the average number of uses per item is below the breakeven point, increasing the number of guests choosing reuse will also increase GHG emissions, water consumption and the waste produced. For there to be a positive impact versus the Single-use scenario, the average number of uses must exceed the breakeven point.

<sup>25</sup> The breakeven point is calculated by adjusting the number of reuses in each scenario until the environmental impact is equal to the Single-use scenario.



## Financial and Operational Impact

**Serving safe and quality food in every single restaurant, each and every day, is a top priority and long-standing commitment of McDonald's. Introducing reusable packaging significantly impacts restaurant operations and requires new processes and effective washing systems to manage food safety and hygiene.**

**Reusable packaging changes the customer journey, which may impact convenience. Where reusables are provided for dine-in, customers can no longer leave the restaurant with food and drinks that they wish to finish on-the-go. For takeout orders, deposit return systems are in place, but do not effectively drive returns based on our experience.**

**Implementing reusable systems impacts both annual ongoing costs and up-front investments for restaurants, including remodeling restaurants for storage, sorting and introducing washing systems.**



# Financial Impact

Implementing reusable systems requires changes in both annual ongoing costs (OPEX) and up-front investments (CAPEX) for restaurants.

OPEX changes stem from changes in the quantities of packaging purchased, washing costs and end-of-life fees. CAPEX changes primarily arise from the need to remodel restaurants for storage, sorting and introducing washing and drying systems, as well as sourcing an initial stock of new reusable packaging, and accommodating new or updated process steps.

In addition to restaurant CAPEX and OPEX costs, the development of reusable packaging systems incurs business costs related to:

- Reusable packaging design, testing and development.
- Supply chain technology development, tooling and capacity building.
- Technology development and deployment to integrate reusables into kitchen technology and digital channels.
- Enabling return systems.
- Establishing digital deposit systems.
- Restaurant and equipment design and development.
- Operations testing and procedures to ensure food safety, quality, speed of service and customer experience.
- People training.

## Operational Costs (OPEX)

McDonald’s experience to date shows that operational costs typically increase when using reusable packaging compared to a single-use packaging model.

The total cost of purchasing packaging can decrease when shifting to reusable packaging, as fewer items need to be purchased over time when the average number of uses is optimal. However, in Scenarios B and C, where the average number of uses is low, we see packaging costs increase as the cost per reusable packaging item is higher than the cost per single-use item.

Introducing reusable packaging creates a new requirement for washing and preparation for the reuse process, resulting in additional costs for restaurants. The cost varies depending on whether restaurants use on-site or off-site washing.

On-site washing could have a lower cost per item in purely OPEX terms, but it requires significant investment in remodeling restaurants to install washing facilities, as well as costs of labor, energy use and detergents. Off-site washing entails external fees.

The decision to use on-site or off-site washing is not just a financial or environmental one – some restaurants will not be able to have on-site washing due to physical constraints. Equally, off-site washing facilities and distribution to and from the restaurant may not be practical or available.

End-of-life costs could decrease slightly with reusables, but this will vary by country. Specific end-of-life costs in different markets are not just associated with the quantity and composition of waste from a restaurant, but also the regulatory environment, with some markets having more stringent taxes associated with waste disposal.

## Capital Investment (CAPEX)

Shifting from using only single-use packaging to a system including reusable packaging requires investment in remodeling restaurants, purchasing equipment and training staff. This cost varies depending on the scope of packaging and channels.

Remodeling restaurants is required for on-site washing and storage. More packaging to be washed on-site entails more capital expenditure. The breakeven number of packaging items washed per year – above which on-site washing becomes more cost-effective – will vary by market.



# Operational Procedures

Introducing reusable packaging significantly impacts restaurant operations. Back-of-house processes must expand and be remodeled to manage storage (sturdy plastic items require larger storage spaces), washing and receipt of both clean and used reusables. A unidirectional process prevents cross-contamination and ensures food safety. Existing equipment also requires adjustments, such as sensors that make our automated beverage filling machines compatible with the weights of reusable cups as compared to single-use cups.

Additional collection points and processes are required to enable customers to return used packaging without disrupting the customer journey and speed of service. Ensuring customers do not leave with or misplace packaging in dine-in settings is essential.

McDonald’s restaurant crew must handle new tasks, such as collecting, sorting and cleaning reusable packaging. Washing and drying packaging on-site necessitates extra equipment and manpower, while off-site cleaning requires new logistical processes for restaurants to send used packaging to be washed and receive clean packaging at required intervals.

Single-use packaging is more compact; therefore multiple versions of a packaging item (such as a fiber clamshell) can be stored – each branded and labeled to match the individual menu item. In comparison, reusable packaging requires more space and needs to be used for multiple menu items – with generic branding and no labeling. As a menu item is no longer recognizable by its packaging, we require a new solution to help restaurant crew identify which product is in each specific packaging item to ensure order accuracy.

# Technology

Integrating reusable solutions into the customer journey requires significant changes to McDonald’s technology and digital channels. Where customers have the option of single-use or reusable packaging, we need to integrate these into systems, such as restaurant kiosks.

Back-of-house technology needs updating to support restaurant teams in identifying which packaging an order should be placed in.

Internal software and stock planning systems must also be updated to handle returns, track the number of uses for certain items and perform analytics to ensure the safe and efficient operation of restaurants.

# Washing Reusable Packaging

Effectively and safely washing reusables is crucial for hygiene and food safety. As previously noted, on-site and off-site washing options have been tested to meet washing standards, with the best choice depending on projected volumes, available space, external provider availability, distance to washing sites and costs.

On-site washing with undercounter dishwashers may be suited for lower-volume operations. High-efficiency hooded dishwashers may be installed to handle larger volumes. However, some McDonald’s restaurants, such as non-freestanding locations (such as restaurants in shopping malls), may be limited to off-site washing due to space constraints.

Off-site washing with industrial conveyor-style washers can be more efficient per item, in terms of GHG emissions associated with washing, but requires high volumes and the transportation of items to centralized washing locations. Long delivery distances in such cases may increase GHG emissions associated with the washing stage.



# Customer Experience

A major consideration for McDonald’s reusable packaging is customer convenience. Reusable packaging adds steps and complexity to the customer journey. Where reusables are provided for dine-in, it means that customers can no longer leave the restaurant with food and drinks that they wish to finish on-the-go. Whereas customers could previously decide where to eat after ordering, they must now confirm that at the point of ordering to ensure they receive the right packaging format. Customers must also understand how and where to return packaging.

Communication and signage in restaurants are needed to explain these processes, especially for return stations, to minimize mis-sorting. For takeout orders, incentives may be needed to drive returns once the customer leaves the restaurant or drive-thru, or if the customer orders their meal in reusable packaging for delivery.

One potential incentive is to set up a deposit return system. Setting deposit rates correctly is crucial to avoid deterring customers from choosing reusables due to increased costs, but also to ensure the deposit incentivizes a return. In Scenarios B and C, where customers can choose reuse or single-use, deposit systems of €1 to €2 per item are in place, but we are experiencing a low number of returns. In Scenario B, the majority of customers (96% of menu items sold) choose the single-use option with a non-refundable surcharge.

Customers expect to return reusable packaging at any McDonald’s restaurant, but as 95% of McDonald’s restaurants globally are franchised, this adds complexity in managing deposits and stock levels. Successfully implementing a reusable packaging program involves navigating these challenges while also maintaining convenience, speed and safety.

Research to understand motivations and barriers for returns should be prioritized by legislators before mandating reusable packaging and deposit systems.

# Food Safety

Single-use packaging is designed to prevent the spread of food-borne illnesses by avoiding any external cross-contamination. Legislation that mandates the introduction of reusables into the foodservice industry (restaurants, cafés, hotels and catering) could increase the risks of cross-contamination between humans, packaging and food due to multi-location cleaning, sanitation, storage and transport – as highlighted by Professor David McDowell, Emeritus Professor of Food Studies at the Ulster University, in a [study](#) commissioned by the European paper packaging industry.

Accepting reusable packaging that has been taken away and returned later by customers can add complexity to our operations, as we need to take additional steps to ensure our hygiene standards.

## Managing Hygiene Standards and Food Safety

Serving safe and quality food in every single restaurant, each and every day, is a top priority and long-standing commitment of McDonald’s. We embed strict food safety standards and protocols in all processes, from food sourcing to menu development, packaging, distribution and the running of McDonald’s restaurants.

Audits by third parties help verify that key food safety standards and procedures are adhered to in McDonald’s restaurants. Follow-up visits by third parties and internal staff are used to help ensure findings are corrected and necessary improvements are implemented. To help ensure that audits are robust, we host calibration sessions with third-party auditing firms.

Food safety experts have been involved in the development and testing of McDonald’s reusable packaging systems, helping to ensure compliance with applicable law regarding, for example, effective cleaning of packaging and the use of appropriate cleaning processes and agents. High levels of standardization and close cooperation with suppliers help maintain control over these metrics.

Our reusable packaging is designed for efficient washing, minimizing risk areas where food or microbes could accumulate. This allows for multiple washing cycles without compromising hygiene standards. Washing protocols prioritize food safety, with high temperatures necessary for sanitization.

Procedures are in place to handle damaged packaging, distinguishing between superficial damages versus those which present food safety risks. Moisture after washing is managed with drying equipment and positively pressurized, filtered air. Where structural constraints prevent the use of drying machines, drying racks are used.



# Appendix



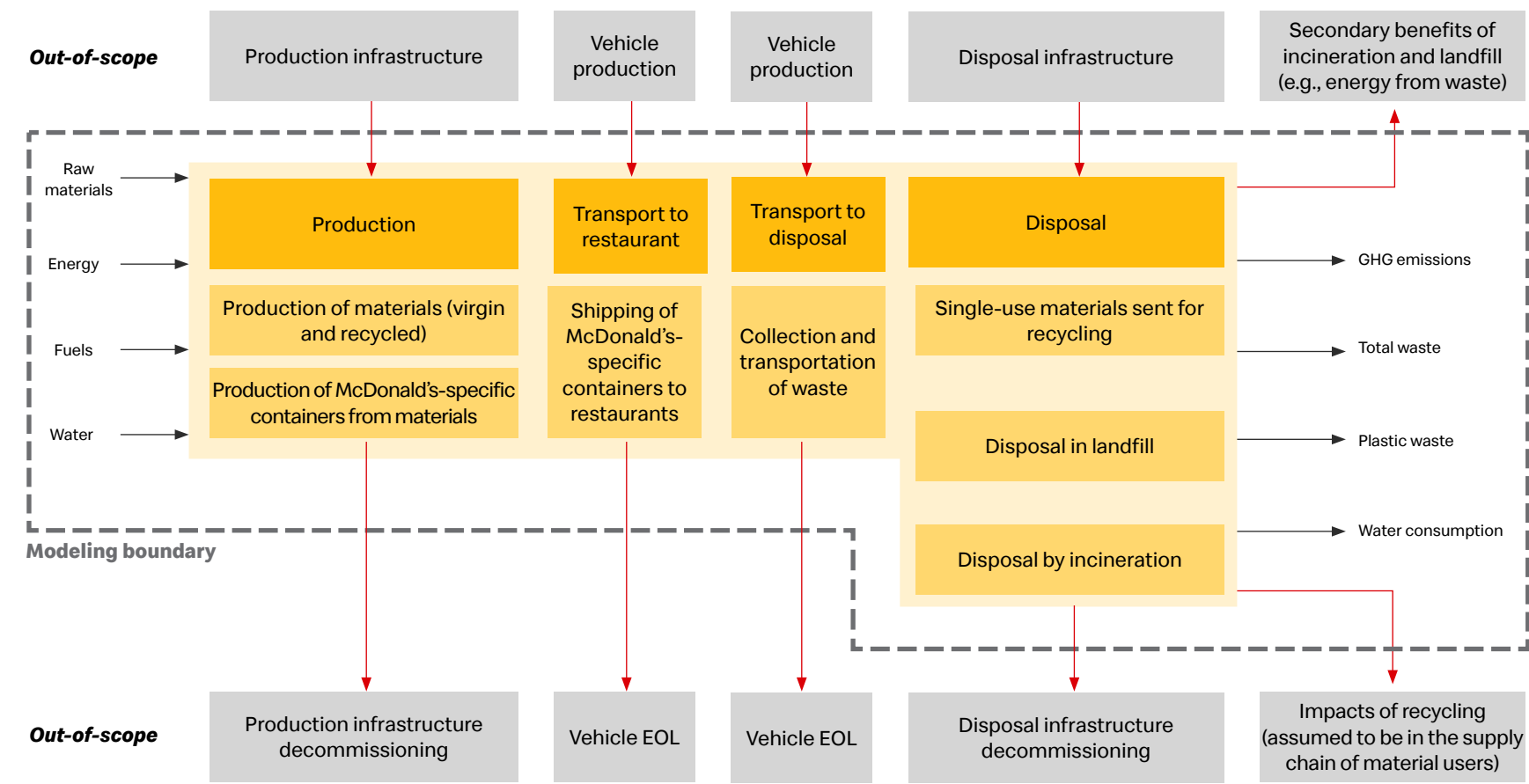
# Boundary

Impacts were calculated for a representative European McDonald's restaurant. The yearly environmental impacts of packaging items were calculated for five process steps:

- 1. Production, including production of raw materials, fabrication to make packaging items and associated transport steps.
- 2. Transport to McDonald's restaurants.
- 3. Preparation for reuse.
- 4. Transport to disposal facility.
- 5. Disposal.

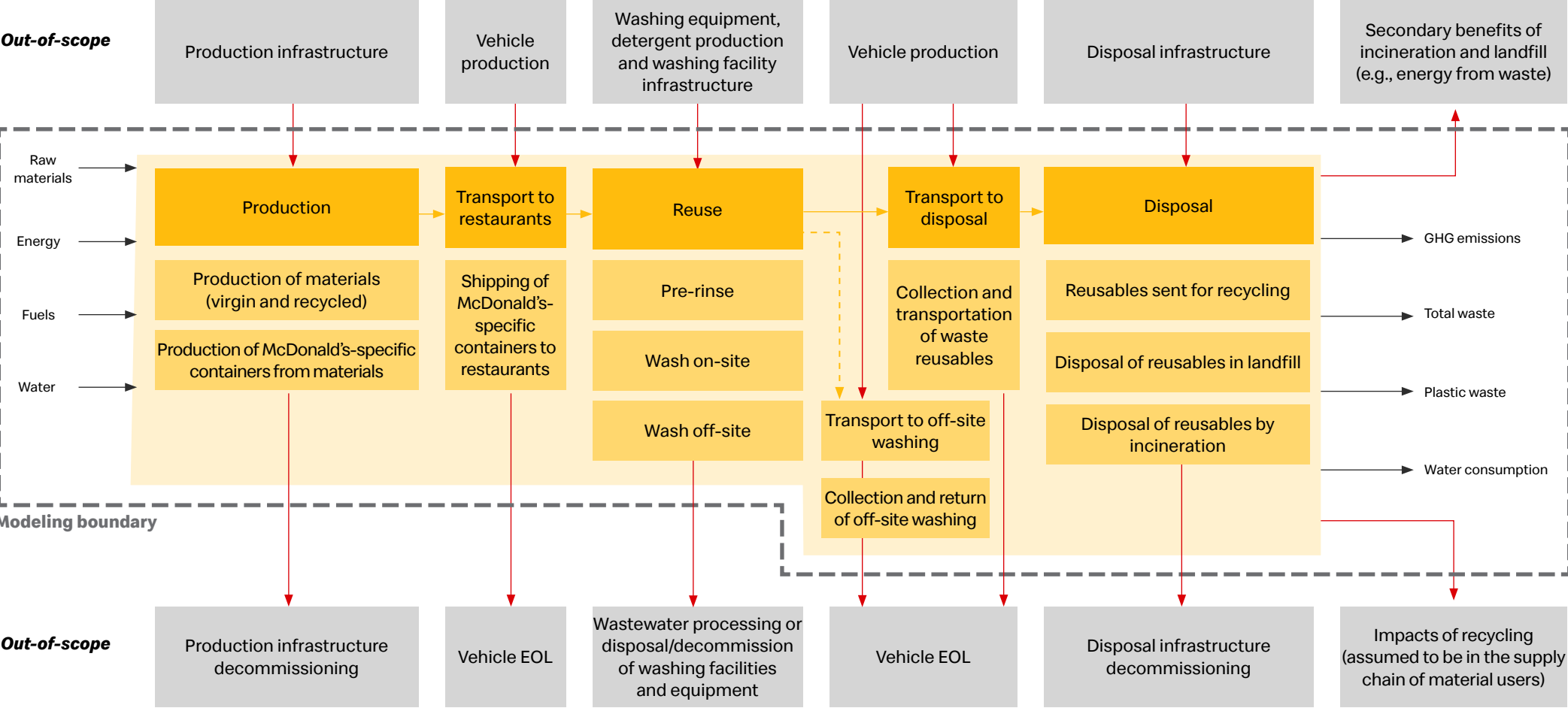
The model boundaries used in this study are summarized to the right for single-use packaging and on [page 36](#) for reusable packaging.

## Single-Use Fiber-Based Packaging Modeling Boundaries





Reusable Packaging Modeling Boundaries





# End-of-Life

End-of-life rates are difficult to track, so assumptions of how consumers dispose of McDonald’s packaging had to be made and could lead to uncertainties in the environmental impacts from the end-of-life of McDonald’s packaging.

The table to the right provides an overview of the assumed end-of-life splits for each scenario and material. The percentages are assumptions of EU averages and are not specific to any country or restaurant. More detailed assumptions are included in [Data Sources and Supporting Assumptions](#).

## Overview of the Key End-of-Life Splits for Each Scenario and Material

| Impact factors      | Scenarios: Single-use, A, B & C – assumed rates |              |                    | Single-use in 2030 and Scenario 2030 – assumed rates                                                                                |
|---------------------|-------------------------------------------------|--------------|--------------------|-------------------------------------------------------------------------------------------------------------------------------------|
| Scenarios           | Fiber                                           | Tritan™      | Polypropylene      | Polypropylene and Fiber 2030                                                                                                        |
| Dine-in recycled    | Fiber: 46%                                      | Tritan™: 0%  | Polypropylene: 18% | This scenario focuses on takeout only – in line with the EU PPWR. The 2030 scenario is compared to single-use results in 2024 only. |
| Dine-in incinerated | Fiber: 36%                                      | Tritan™: 67% | Polypropylene: 55% |                                                                                                                                     |
| Dine-in landfill    | Fiber: 18%                                      | Tritan™: 33% | Polypropylene: 27% |                                                                                                                                     |
| Takeout recycled    | Fiber: 3%                                       | Fiber: 3%    | Polypropylene: 23% | Polypropylene: 24%<br>Fiber: 39%                                                                                                    |
| Takeout incinerated | Fiber: 65%                                      | Fiber: 65%   | Polypropylene: 55% | Polypropylene: 62%<br>Fiber: 50%                                                                                                    |
| Takeout landfill    | Fiber: 32%                                      | Fiber: 32%   | Polypropylene: 26% | Polypropylene: 14%<br>Fiber: 11%                                                                                                    |



# Data Sources and Supporting Assumptions

| Category         | Parameter                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Source                                                            |
|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| Packaging mix    | Fiber packaging mix from McDonald’s suppliers is mapped to three paper grades.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | McDonald’s internal data                                          |
| Packaging mix    | Single-use drink cups are made with a plastic lining. All takeout single-use cups are served with fiber lids. For dine-in, ~75% of cups are served with fiber lids and 25% without lids.                                                                                                                                                                                                                                                                                                                                                                                                                 | McDonald’s internal data                                          |
| Packaging mix    | Scenario A (France) uses Tritan™ reusable cups for dine-in without lids and no straws. All takeout packaging in Scenario A (France) is single-use.                                                                                                                                                                                                                                                                                                                                                                                                                                                       | McDonald’s internal data                                          |
| Packaging mix    | Scenario B (Netherlands) uses polypropylene reusable cups and does not include reusable lids.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | McDonald’s internal data                                          |
| Packaging mix    | Scenario C (Germany) uses polypropylene reusable cups and includes reusable lids.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | McDonald’s internal data                                          |
| Packaging mix    | Scenario 2030 uses a reusable packaging portfolio for all menu items (not including pre-packed items) made from polypropylene. All drinks are served with reusable lids.                                                                                                                                                                                                                                                                                                                                                                                                                                 | McDonald’s internal data                                          |
| Packaging mix    | McDonald’s 2024 data was used to determine an average composition and weight of McDonald’s single-use guest packaging in Europe.                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | McDonald’s internal data                                          |
| Packaging mix    | Where fiber cups had a plastic polyethylene liner, it was assumed the quoted recycled content percentage provided by McDonald’s suppliers was for only fiber material.                                                                                                                                                                                                                                                                                                                                                                                                                                   | Assumption                                                        |
| Packaging mix    | A consistent split of around 30% of guest packaging items was used for dine-in and around 70% for takeout for each scenario.                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | McDonald’s internal data                                          |
| Packaging mix    | Cutlery is linked with orders – all ice creams come with a spoon, and all salads come with a knife and a fork.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | McDonald’s internal data                                          |
| Packaging mix    | Straws are not used with reusable packaging.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | McDonald’s internal data                                          |
| Electricity grid | Grid carbon emissions factors are from the International Energy Agency (IEA) World Energy Outlook (WEO) 2023. Grid emissions factors are based on an EU average, not a weighted average based on the country distribution of McDonald’s restaurants. The IEA WEO grid emissions factors do not include transmission and distribution energy losses. The Department for Energy Security and Net Zero Greenhouse gas reporting: conversion factors 2023 estimate for transmission and distribution losses was used to increase IEA grid emissions factors to include transmission and distribution losses. | International Energy Agency (IEA) World Energy Outlook (WEO) 2023 |
| Electricity grid | For single-use material production, the electricity grid is based on the specific energy grid from their production sites in the Nordic countries.                                                                                                                                                                                                                                                                                                                                                                                                                                                       | McDonald’s supplier data                                          |



| Category         | Parameter                                                                                                                                                                                                                                                                                                                                                                                                                   | Source                                                                                                                                                                                            |
|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Electricity grid | For reusable packaging materials from Ecoinvent, a generalized European electricity grid was used.                                                                                                                                                                                                                                                                                                                          | Ecoinvent Database Version 3.9.1                                                                                                                                                                  |
| Electricity grid | Water consumption impacts were modeled using the IEA WEO 2023 grid mix for the EU in 2023 and the projected 2030 grid under the Stated Policies Scenario. These grid mixes, combined with water consumption factors for each energy technology from the Ecoinvent database, were used to estimate average grid water consumption impact factors.                                                                            | International Energy Agency (IEA) World Energy Outlook (WEO) 2023<br>Ecoinvent Database Version 3.9.1                                                                                             |
| Production       | Environmental impacts for production of fiber packaging material is from McDonald’s European suppliers.                                                                                                                                                                                                                                                                                                                     | McDonald’s supplier data                                                                                                                                                                          |
| Production       | Environmental impacts from production of all plastic packaging materials besides Tritan™ is from the Ecoinvent life cycle analysis (LCA) database.                                                                                                                                                                                                                                                                          | Ecoinvent Database Version 3.9.1                                                                                                                                                                  |
| Production       | Environmental impacts from production of Tritan™ plastic is from an internal LCA.                                                                                                                                                                                                                                                                                                                                           | McDonald’s internal data                                                                                                                                                                          |
| Production       | Assumed no decarbonization in the production of raw materials between present day and the 2030 analysis.                                                                                                                                                                                                                                                                                                                    | Assumption                                                                                                                                                                                        |
| Production       | Assumed no wastage of material during product fabrication and shaping of materials to packaging items.                                                                                                                                                                                                                                                                                                                      | Assumption                                                                                                                                                                                        |
| Production       | Electricity use required for the fabrication (production of the reusable packaging items from the raw materials) is from an internal LCA.<br><br>It is assumed that all CO <sub>2</sub> e emissions emitted during the fabrication step are from electricity use. The model assumes packaging item fabrication impacts are proportional to packaging item weight.                                                           | McDonald’s internal data                                                                                                                                                                          |
| Transport        | Assumed that all delivery trucks used for transportation are fully loaded.                                                                                                                                                                                                                                                                                                                                                  | Assumption                                                                                                                                                                                        |
| Transport        | The emissions factor for fully loaded diesel heavy goods vehicles (HGVs) is used as the diesel HGV CO <sub>2</sub> e emission factor in this model.<br><br>The ratio of diesel to biodiesel CO <sub>2</sub> e emission factors from the UK Department for Energy Security and Net Zero’s <i>Greenhouse Gas Reporting: Conversion Factors 2023</i> is used to estimate the emissions factor for fully loaded biodiesel HGVs. | UK Department for Energy Security and Net Zero’s <i>Greenhouse Gas Reporting: Conversion Factors 2023</i> .                                                                                       |
| Transport        | Liquefied natural gas HGVs have a 10% lower CO <sub>2</sub> e emissions factor compared to diesel HGVs.                                                                                                                                                                                                                                                                                                                     | Gnap, J. and Dočkalík, M., 2023. Renewal of buses and registration of new buses in the Slovak Republic and the Czech Republic. <i>Journal of Applied Engineering Science</i> , 21(1), pp.116–126. |



| Category  | Parameter                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Source                                                                                                    |
|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|
| Transport | Well-to-tank CO <sub>2</sub> e emission factors data set is provided from the UK Department for Energy Security and Net Zero's <i>Greenhouse Gas Reporting: Conversion Factors 2023</i> .                                                                                                                                                                                                                                                                                                                                                                                                                      | UK Department for Energy Security and Net Zero's <i>Greenhouse Gas Reporting: Conversion Factors 2023</i> |
| Transport | Vehicle fleet assumed to be 89% diesel and biodiesel and 11% liquefied natural gas in the present-day scenarios.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | McDonald's internal data                                                                                  |
| Transport | Transport of materials in production of fiber is taken from McDonald's supply chains and vehicle fleet data.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | McDonald's internal data                                                                                  |
| Transport | In 2030, the European fleet is expected to be 37% electric delivery trucks, with the remainder of the fleet mirroring the present-day composition – based on the EU vehicle electrification targets.                                                                                                                                                                                                                                                                                                                                                                                                           | McDonald's supplier data                                                                                  |
| Transport | Electric vehicles assumed to be charged from the average grid.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Assumption                                                                                                |
| Transport | It is assumed the same supplier is used for initial stock of reusable packaging and for ongoing delivery to replace disposed, lost or damaged items, meaning transport distances remain consistent.                                                                                                                                                                                                                                                                                                                                                                                                            | Assumption                                                                                                |
| Transport | Average distance from supplier to distribution center is based on 62% of single-use packaging suppliers. A denser network of suppliers is assumed for the 2030 analysis, and the same transport distance as fiber scenarios is applied.                                                                                                                                                                                                                                                                                                                                                                        | McDonald's internal data                                                                                  |
| Reuse     | <p>The preparation for reuse phase calculates the impacts associated with:</p> <ul style="list-style-type: none"><li>• Electricity and gas use and water consumption for pre-rinsing items before the main washing stage.</li><li>• The electricity and water-use impacts of washing reusable packaging in McDonald's restaurants.</li><li>• The transport emissions associated with transporting reusable items for off-site washing where required (modeled using the same assumptions as the transport to restaurant phase).</li><li>• The electricity and water-use impacts of off-site washing.</li></ul> | McDonald's internal data                                                                                  |
| Reuse     | Impacts associated with off-site and on-site washing were calculated using dishwashers present in McDonald's markets and data from off-site washing providers.                                                                                                                                                                                                                                                                                                                                                                                                                                                 | McDonald's internal data                                                                                  |
| Reuse     | The model does not account for a material improvement in washing and drying machinery between current and 2030 analysis due to the replacement life cycle of the machines.                                                                                                                                                                                                                                                                                                                                                                                                                                     | Assumption                                                                                                |
| Reuse     | The modeling assumes no wastage of packaging during service e.g., only one container per item served.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Assumption                                                                                                |



| Category    | Parameter                                                                                                                                                                                                                                                               | Source                                  |
|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|
| Reuse       | The split of gas to electric boilers for pre-rinse in McDonald’s across Europe can be estimated with a weighted average of the split for restaurants in Germany and France, by number of restaurants.                                                                   | Assumption                              |
| Reuse       | Wash-reuse phase assumes all ice cream packaging items are pre-rinsed.                                                                                                                                                                                                  | Assumption and McDonald’s internal data |
| Reuse       | For items being pre-rinsed, the split between in-restaurant and external pre-rinse is the same as the split for washing in restaurant and externally.                                                                                                                   | Assumption                              |
| Reuse       | The modeling relies on the same process for pre-rinsing in restaurant and externally washed items.                                                                                                                                                                      | McDonald’s internal data                |
| Reuse       | The environmental impact of producing additional washing machines for in-store washing is excluded on the basis that the effective lifetime of a washing machine is much longer than the modeling period of one year.                                                   | Assumption                              |
| Reuse       | The transport distance to end-of-life treatment is the same irrespective of the specific treatment or point of disposal (in the restaurant, at home or on-the-go into municipal waste system).                                                                          | Assumption                              |
| Reuse       | Transport distance is taken from restaurant to end-of-life treatment from McDonald’s markets and supply chain.                                                                                                                                                          | Assumption                              |
| Reuse       | The analysis assumes all single-use and reusable packaging used for dine-in is disposed of on-site.                                                                                                                                                                     | McDonald’s internal data                |
| End-of-life | Proportion of restaurants with split waste bins.                                                                                                                                                                                                                        | McDonald’s internal data (2023)         |
| End-of-life | Recycling rate is the percentage of the waste that reaches the recycler that can be recycled and is not disposed of due to, for example, food contamination.                                                                                                            | Assumption                              |
| End-of-life | All takeout orders are assumed to be disposed of either on-the-go (75%) or disposed of at the consumer’s home (25%).                                                                                                                                                    | Assumption                              |
| End-of-life | For the Single-use scenario and Scenarios A, B and C, it is assumed all packaging disposed of on-the-go currently enters the municipal waste stream to incineration or landfill only. In the 2030 analysis, 10% of on-the-go packaging waste will be sent to recyclers. | Assumption                              |
| End-of-life | The recycling rate for Tritan™ is assumed to be 0% due to it not being widely recyclable across the EU.                                                                                                                                                                 | Assumption                              |



| Category    | Parameter                                                                                                                                                                                                                                                                                                                                                                             | Source                                                                                                                                                                                      |
|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| End-of-life | The effective recycling of waste disposed of at the consumer’s home is dependent on whether dual-stream, single-stream or no domestic recycling is present in the local municipality, the percentage of packaging that is placed into the recycling stream and the percentage of material that reaches the recycler that can be recycled.                                             | Eurostat. (2023). Packaging waste by waste management operations. Eurostat. (2023). Recycling rates of packaging waste for monitoring compliance with policy targets, by type of packaging. |
| End-of-life | An average of the incineration-to-landfill-disposal ratio of municipal waste across Europe, weighted by number of McDonald’s in each country, is used to estimate this split in the present comparisons.                                                                                                                                                                              | Municipal waste landfilled, incinerated, recycled and composted, EU, 1995–2021.                                                                                                             |
| End-of-life | For the 2030 analysis, the proportion of waste that enters the landfill waste stream is reduced in line with achieving the 2020 amendment to the EU Landfill Directive’s goal of limiting the share of municipal waste landfilled to 10% by 2035.                                                                                                                                     |                                                                                                                                                                                             |
| End-of-life | The model excludes any secondary benefits of incineration and landfill, such as energy generation from incineration or methane captured from landfill sites.                                                                                                                                                                                                                          | Assumption                                                                                                                                                                                  |
| End-of-life | Impact factors for incineration and landfill from the Ecoinvent LCA database were used to calculate the end-of-life impacts in this model. In line with Intergovernmental Panel on Climate Change and global climate reporting standards, emissions from combusting fiber are classed as biogenic, leading to a much smaller carbon intensity in comparison to combustion of plastic. | Ecoinvent Database Version 3.9.1                                                                                                                                                            |
| End-of-life | As the model includes the environmental impacts from the production of recycled material in the product mix, environmental impacts from recycling at the end-of-life are excluded to avoid double counting.                                                                                                                                                                           | Design                                                                                                                                                                                      |
| End-of-life | This model does not include impacts associated with the production or end-of-life of supporting infrastructure, such as machinery, transportation fleet or disposal infrastructure.                                                                                                                                                                                                   | Design                                                                                                                                                                                      |

**Forward-Looking Statements**

This document contains certain forward-looking statements, which reflect management’s expectations regarding future events and operating performance and speak only as of the date hereof. In particular, statements regarding McDonald’s plans, strategies, prospects and expectations regarding its business and industry are forward-looking statements. They reflect McDonald’s expectations, are not guarantees of performance and speak only as of the date hereof. These forward-looking statements involve a number of risks and uncertainties. Factors that could cause actual results to differ materially from expectations are detailed in the Company’s filings with the Securities and Exchange Commission. The Company undertakes no obligation to update such forward-looking statements, except as may otherwise be required by law. You should not rely unduly on forward-looking statements.



More information on McDonald’s progress and actions are covered in our [\*\*Purpose & Impact Report\*\*](#).