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Municipal Waste Report for 2024 – in accordance with the Annual Implementation Plan of Statistical Activities of the Republic of Croatia for 2025

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Municipal Waste Report for 2024 – in accordance with the Annual Implementation Plan of Statistical Activities of the Republic of Croatia for 2025

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Table of contents

Abbreviation List

AIP 2025 – Annual Implementation Plan of Statistical Activities of the Republic of Croatia for 2025
CBS – Croatian Bureau of Statistics
EPEEF – Environmental Protection and Energy Efficiency Fund
EPR – Emission Pollution Registre
LGUs - Local self-goverment units
MBT – mechanical-biological treatment
MEPGT – Ministry of Environmental Protection and Green Transition
MW – municipal waste
OOO – Landfill and waste disposal form
OZO – Recovery / Disposal waste form " for waste processors, Emission Pollution Registre
SO-1 – " Public service on accounting place and containers on public surfaces " form, Emission Pollution Registre
SO-2 –Waste collection form, Emission Pollution Registre
SO-3 – Set of forms for mobile civic amenity sites (SO3-1), civic amenity sites (SO3-2) and waste retailers (SO3-3), Emission Pollution Registre
WC – waste code
WMA – Waste Management Act ("Official Gazette" 84 /21, 142/23)

Summary

This report was prepared in accordance with the Annual Implementation Plan of Statistical Activities of the Republic of Croatia (hereinafter AIP 2025).

The report is an abridged version of the Report on Municipal Waste for 2024, which was prepared and published by the Ministry of Environmental Protection and Green Transition (hereinafter: MEPGT) in March 2025. This abridged version of the report does not provide data at the level of legal and/or natural persons and other data that could be linked to an individual legal and/or natural person, which is in accordance with Article 63 of the Official Statistics Act (OG 25/20, 155/23).

The report is mostly based on data 2024 reported to the Emission Pollution Registre database (hereinafter: the EPR database) by:

- public service providers via SO -1 form
- civic amenity sites and waste retailers via SO -3 forms and
- waste processors via OZO form.

The "export" of data from the EPR database for the purposes of making calculations at the national level was made on February 18, 2025.

In addition to the data reported to the EPR database, data from waste exporters was also used and an estimate of quantities was made for the part of the population not covered by organized municipal waste collection.

Data on municipal waste to the EPR database and data on transboundary movement of municipal waste for the year 2024 were submitted by companies at the request of MEPGT before the prescribed deadlines, in order to timely report to the European Commission on the achievement of the quantitative indicator C1.3.R2 from the National Recovery and Resilience Plan 2021-2026, according to which it is necessary to reduce the share of municipal waste submitted to disposal to 51% by the end of the fourth quarter of the year 2024.

The processing and analysis of data as well as the preparation of the Report are based on the provisions of the Waste Management Act (Official Gazette, No. 84/21, 142/23 hereinafter WMA), which had been put into effect on 31 July 2021. The above refers in particular to the application of the definition of public municipal waste collection service (hereinafter referred to as: public service) from Article 64 of the Waste Management Act, according to which the public service includes the collection of mixed municipal waste from households and other sources; biowaste from households, recyclable municipal waste, hazardous municipal waste and bulky waste from households.

When calculating the recycling rate of municipal waste, the methodology prescribed by Commission Implementing Decision (EU) 2019/1004 of 7 June 2019 laying down rules for the calculation, verification and transmission of data on waste in accordance with Directive 2008/98/EC of the European Parliament and of the Council as well as repealing Commission Implementing Decision C (2012) 2384 is applied. When calculating the quantities of recycled waste, aforementioned Implementing Decision requires the inclusion of quantities that are actually recycled, without impurities and non-target materials that were separated from the waste before or during the recycling process itself.

The tables below provide a concise overview of the generated municipal waste and municipal waste management in 2024, as well as the status of achieving the prescribed targets

Table 1 Generated municipal waste and the management of municipal waste in 2024.

	Republic of Croatia - Total	Republic of Croatia (%) - Total
Generated:	1,878,802 tons (486 kg/ capita)	
Scope of population covered by organized collecting of municipal waste		99.9%
Separately collected:	920,374 tons (public service - 437,568 t)	49.0% (public service – 32.4%)
Recycling:	689,593 tons	36.7%
Energy recovery R1:	28,339 tons	1.5%
Disposal:	957,094 tons	50.9%
Other [1]:	203,776 tons	10.9%

Table 2 Implementation status of prescribed targets concerning municipal waste in 2024.

Target	Value for 2024	Status of target achievement
WMA target (Article 54): At least 50% of the total mass of the waste generated in households and the waste from other sources whose waste streams are similar to household waste streams, which includes at least paper, metal, plastics and glass, shall be recovered through recycling and preparation for re-use.	Recycling rate of municipal waste: 36.7%	Continued positive trend of progress and additional infrastructural conditions created for achieving target.
WMA target (Article 55):	Amount of landfilled biodegradable municipal	Continued positive trend of progress, but

[1] Temporarily stored quantities and estimated quantities for non-covered part population, quantity incinirated without energy recovery, waste mass losses during treatment processes, quantities addressed on pre-treatment on bioreactor, etc.

Target	Value for 2024	Status of target achievement
The maximum allowed mass of biodegradable municipal waste that may be landfilled in a calendar year, for all waste management licenses in the Republic of Croatia is 264,661 tons, which is 35% of the mass of biodegradable municipal waste produced in 1997, i.e. 35% of the mass of biodegradable municipal waste generated in 1997.	waste on landfills in the Republic of Croatia: 502,752 t	the target is not reached.

Data on municipal waste for the year 2024 have been reported for all 556 local self-management units (hereinafter LGUs). According to registered data the public service of collecting mixed municipal waste was being carried out by 194 companies.

Since 2016 the collection and transportation of municipal waste in all municipalities and cities is being carried out in an organized manner. The coverage of population by organized collecting of municipal waste in 2024. was 99.9%.

In 2024, 1,878,802 tons of municipal waste were generated, which represents an increase of 2.5% in relation to the previous year. The annual amount of municipal waste generated per inhabitant was 486 kg.

In 2024, the continuous implementation of educational and informational activities aimed at raising citizens' awareness of their role in generating and preventing waste, as well as in separating waste at the source, will continue. Investments in infrastructure for separate collection of municipal waste, such as containers for doorstep collection, construction of civic amenity sites, procurement of vehicles, construction of sorting facilities, and more will also continue.

In 539 LGUs (97% of all LGUs), separate collection of municipal waste was implemented, and the separate collection rate increased by 1 percentage point compared to the previous year. The share of separately collected municipal waste (all types of municipal waste except mixed municipal waste) in 2024 was 49%, meaning that 920,374 tons of municipal waste were separately collected. Mixed municipal waste (waste code 20 03 01) accounted for 51%, or 958,427 tons, of all collected waste.

The largest contribution to the increase in separate collection of municipal waste compared to the previous year came from separately collected biowaste (up by 19,935 tons), plastic waste (up by 11,198 tons), and bulky waste (up by 9,679 tons).

Over the past three years, the increase in the separate collection rate has continued, though at a somewhat slower pace. More significant growth is hindered by impurities found in separately collected waste, which, when present in higher proportions, are classified as mixed municipal waste.

The counties with the highest separate collection rates within public services in 2024 were: Međimurje County (57.2%), Koprivnica-Križevci County (50.8%), the City of Zagreb (44.7%), Varaždin County (42.3%), and Osijek–Baranja County (41.4%).

The counties with the lowest separate collection rates within public services in 2024 were: Dubrovnik–Neretva County (11.0%), Zadar County (16.7%), and Lika–Senj County (17.0%).

A comparison of separate collection rates within public services between 2023 and 2024 shows an increase in all counties. The counties with the largest increase in 2024 were: Bjelovar–Bilogora County (from 20.7% in 2023 to 27.6% in 2024), Požega–Slavonia County (from 21.6% to 28.2%), and Sisak–Moslavina County (from 26.5% to 32.6%). All three recorded the largest increases in separately collected biowaste, paper, and plastics. A significant increase in separately collected glass was recorded in Brod–Posavina County, while bulky waste increased notably in Požega–Slavonia County and Brod–Posavina County.

Despite recorded increases in separate waste collection at the national level, national results still remain unsatisfactory, considering that the counties generating the largest quantities of municipal waste are progressing more slowly.

In total, 527,000 tons of biowaste from municipal waste were generated in 2024 (both as part of mixed municipal waste and as separately collected biowaste). Separate biowaste collection was implemented in all counties, but only in 270 local governments, or 49% of all local governments. This represents an increase of 27 local governments compared to the previous year (243 LGUs). The quantity of separately collected biowaste increased by 15%, reaching 171,807 tons. The biowaste separate collection rate was 33%, an increase of 3 percentage points (22,142 tons) compared to 2023 Considering separately collected quantities within public services, the largest increases in 2024 were recorded in the City of Zagreb (up by 12,541 tons), followed by Međimurje County (up by 1,302 tons), Sisak–Moslavina County (up by 1,146 tons), and Osijek–Baranja County (up by 1,145 tons).

The results of further investments in opening and equipping new civic amenity sites in 2024 are evident in a 15% increase in the amount of waste collected through civic amenity sites compared to the previous year. In 2024, 300 civic amenity sites were active in 315 LGUs, receiving a total of 90,257 tons of municipal waste. As in previous years, the most collected waste types were bulky waste (44%) and wood waste (18%).

In 2024, 721,553 tons of municipal waste were recovered, while 689,593 tons were recycled (including composting and anaerobic digestion). This means that the municipal waste recovery[2] rate was 38%, and the recycling rate 37%. **Compared to the previous year, the recovery rate remained unchanged, while the recycling rate increased by 1 percentage point.** This means that the target of 50% set by Article 54 of the Waste Management Act and the EU Waste Framework Directive[3] has still not been achieved.

Considering the recovery rate of municipal waste collected within public services, the national rate was 27%, while the recycling rate was 25%. The counties with the highest recycling rates were Međimurje County (48%), the City of Zagreb (42%), and Koprivnica-Križevci County (40%). The lowest recycling rates within public services were recorded in Lika–Senj County (6%) and Dubrovnik–Neretva County (8%).

[2] *Recovery* of waste is any operation whose main result is the use of waste for a useful purpose, whereby waste replaces other materials that would otherwise have to be used for that purpose, or waste that is prepared in order to fulfil that purpose, either in a facility or in a broader economic context.

[3] Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives

After adding additional quantities (waste from the commercial sector, waste collected through the national system for special waste categories organized by the Environmental Protection and Energy Efficiency Fund (hereinafter EPEEF), estimates for the population not covered by organized collection, etc.), the highest overall estimated recycling rates were recorded in Međimurje County (56%), Varaždin County (50%), the City of Zagreb (49%), and Koprivnica-Križevci County (45%). Counties with the lowest estimated recycling rates remained Lika–Senj County (18%) and Dubrovnik–Neretva County (20%).

A comparison of the estimated total recycling rates by county with the previous year shows a decline in most counties. However, this decline does not indicate a deterioration in the waste management system, but is rather the result of methodological adjustments. From 2020 to 2023, recycled quantities were calculated using data on processed quantities reported by waste processors in the EPR database and impurity data determined by the Ministry based on research covering major waste processors. From the 2024 reporting year onward, new reporting forms require all companies performing recycling to report actual quantities of recycled waste (excluding impurities and non-target materials), rather than only input quantities sent for processing as in previous years.

In total, 131,457 tons of municipal waste underwent biological treatment. Municipal waste was composted at 16 composting facilities, with a total of 80,411 tons composted. The quantity of composted waste in 2024 shows a 14% decrease compared to the previous year. This change can be attributed to the methodological adjustments introduced in 2024, when new EU-aligned reporting rules were implemented in the EPR system, particularly regarding the calculation of recycled waste. In 2024, out of 25 biogas plants that accepted waste for processing, 15 processed municipal waste. Compared to the previous year, the quantity of municipal waste treated through anaerobic digestion increased by 129%, or 28,730 tons. This resulted in a total of 51,046 tons of processed municipal waste, mostly biodegradable kitchen and canteen waste (71.6%) and biodegradable garden and park waste (26.7%), followed by market waste (1.8%).

From 2005 to 2024, 318 landfill sites were recorded and monitored, of which 307 were potential municipal waste disposal sites during that period. In 2024, municipal waste was disposed of at 76 landfills.

The amount of biodegradable municipal waste landfilled in the Republic of Croatia amounted to 502,752 tons. The target set by Article 55 of the Waste Management Act regarding the reduction of landfilling biodegradable municipal waste was not met.[4]

During 2024, the total amount of municipal waste landfilled was 957,094 tons. This means that the municipal waste landfilling rate in 2024 was 51%, which is 1 percentage point lower than in 2023.

In addition to the 51% landfilled and 38% recovered municipal waste, about 7% of municipal waste includes quantities sent for further treatment at bioreactor-type cells within waste management centers, quantities incinerated without energy recovery, temporarily stored

[4] The maximum permitted mass of biodegradable municipal waste that may be landfilled in a calendar year, in accordance with all waste management permits in the Republic of Croatia, is 264,661 tonnes, which represents 35% of the mass of biodegradable municipal waste generated in 1997.

quantities, and estimated quantities for the non-covered population segment for which disposal methods could not be determined. The remaining 4% refers to mass losses occurring during processing (dust, moisture, etc.)

1. Introduction

Municipal waste includes mixed municipal waste and separately collected waste from households, including paper and cardboard, glass, metal, plastic, biowaste, wood, textiles, packaging, waste electrical and electronic equipment, waste batteries and accumulators, and bulky waste such as mattresses and furniture, as well as mixed municipal waste and separately collected waste from other sources, provided that such waste is similar in nature and composition to household waste. Municipal waste does not include waste from manufacturing, agriculture, forestry, fisheries, and aquaculture, septic tanks and sewerage systems and wastewater treatment facilities (including sewage sludge), end-of-life vehicles, and construction and demolition waste. This definition does not affect the allocation of waste management responsibilities between public and private entities. It covers waste corresponding to the types listed under subgroup 15 01 (waste packaging, including separately collected packaging from municipal waste) and group 20 (waste from households and similar waste from trade, industry, and institutions, including separately collected components) of the Waste Catalogue, except for the following waste types: 20 02 02 (soil and stones), 20 03 04 (septic tank sludge), and 20 03 06 (waste from sewer cleaning). Waste from other Waste Catalogue groups is not considered municipal waste unless, after treatment, it is assigned a key number from group 19 of the Waste Catalogue.

For the purpose of correct and consistent use of waste key numbers from the Waste Catalogue, an application titled "KN* Application – Determine the Waste Code" has been established on the MEPGT website (available at: http://EPR.azo.hr/katOtpada/), which also provides guidance on waste categorization procedures (https://isgo-portal.mingor.hr/hr/o-kategorizaciji).

The obligation to maintain data on municipal waste for 2024 was prescribed by the Waste Management Act (WMA). The Waste Management Ordinance ("Official Gazette", Nos. 106/2022, 138/2024) and the Ordinance on the Pollutant Release and Transfer Register ("Official Gazette", No. 3/22) (hereinafter the EPR Ordinance) set out the obligations regarding the methods and deadlines for recording and reporting data on municipal waste in the Environmental and Nature Protection Information System, established and managed by MEPGT. The EPR Ordinance defines the data reporting obligations, submission deadlines, quantity thresholds for reporting by waste producers, the content of reporting forms, and other requirements. Public service providers enter data on collected municipal waste quantities into form SO-1, and only for waste types from group 20 and subgroup 15 01 of the Waste Catalogue collected within the public municipal waste collection service. Civic amenity sites and retail waste collectors enter data on received waste quantities into form SO-3.

Collectors enter data on quantities of municipal waste that were not collected within the public service into form SO-2. Data on recovered/disposed quantities of municipal waste are entered into OZO form. For data submission, obligated entities use the EPR application accessible through the MEPGT website, based on an assigned user account. County Environmental Protection Departments and the responsible office of the City of Zagreb, in cooperation with the competent inspection services, are required to ensure verification of the completeness, consistency, and accuracy of the data, i.e. to ensure quality control of the submitted data. In

addition to the County Departments, MEPGT performs additional quality control. Based on verified data, MEPGT prepares annual waste reports and publishes them on its website.

To reduce the administrative burden on reporting entities and improve data quality, data on landfilling and landfill sites previously reported through the Central Information Management System on Landfills (Landfill Database – Form OOO) have, starting from the 2024 reporting year, been submitted through the EPR database.

2. Overview of the Situation from 1995 to 2024

2.1 Population Coverage by Organized Municipal Waste Collection in the Republic of Croatia (1995–2024)

Since 2016, all municipalities and cities in the Republic of Croatia have been covered by organized municipal waste collection.

In the period from 2014 to 2020, population coverage by organized municipal waste collection remained stable at approximately 99%. In 2021, an increase was recorded, bringing the coverage rate above 99%. Minor variations in the values for the 2021–2023 period resulted from the use of different 2021 Census datasets[5] by obligated entities when reporting data.

For the 2024 reporting year, obligated entities were allowed to use the official population estimates as of 31 December 2023, issued by the Croatian Bureau of Statistics (hereinafter CBS), when reporting population coverage. According to the submitted data, population coverage amounted to 99.9% (Figure 1). Additionally, for all future reporting years, the EPR database will continue to provide the most recent official CBS population estimate as of 31 December of the reference year for the purpose of reporting population coverage.

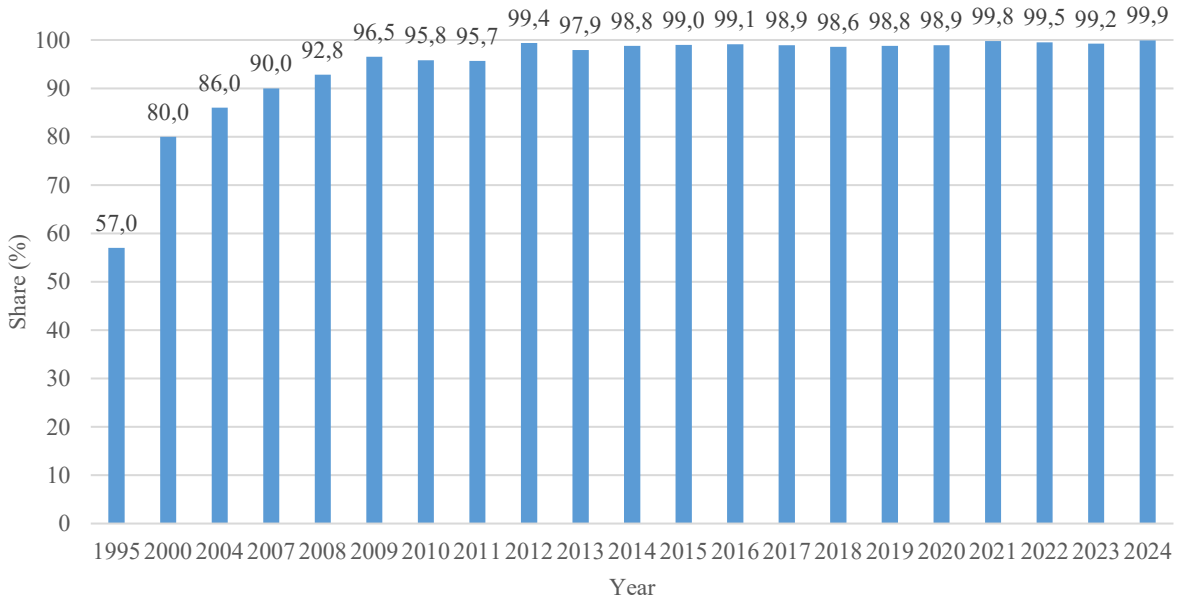


Figure 1 Coverage of the population by organized municipal waste collection in the Republic of Croatia from 1995 to 2024

[5] Preliminary census results; final census results

2.2 Quantities of Generated Municipal Waste in the Republic of Croatia from 1995 to 2024.

Data on generated municipal waste in the Republic of Croatia prior to 2005 were largely based on estimates. From 2006 onward, quantities have been determined according to data reported by obligated entities, supplemented by estimates for the portion of the population not covered by organized collection and for municipalities that did not submit data.

It should be noted that since 2011, the calculation has also included data on municipal waste (waste paper and cardboard, packaging waste, waste edible oils, batteries and accumulators, etc.) from the service sector (schools, kindergartens, offices, hotels, retail establishments...) as well as data on special waste categories collected within the system organized by the Environmental Protection and Energy Efficiency Fund (EPEEF).

Furthermore, since 2015, in accordance with Eurostat guidance, the following waste types are no longer included in municipal waste: 20 02 02 (soil and stones), 20 03 04 (septic tank sludge), and 20 03 06 (waste from sewer cleaning). This was subsequently incorporated into the revised Waste Framework Directive.[6]

The long-term growth trend in generated municipal waste observed since 1995 came to a halt in 2008, followed by a decrease in reported quantities until 2010, which can be attributed to the economic crisis.

From 2011 onward, quantities began rising again, with declines recorded in 2020 and 2021 as a result of the COVID-19 pandemic. Due to the significant reduction in activity within the service sector (closure of hospitality establishments, reduced number of tourist overnight stays), municipal waste quantities fell to 2014 levels. As service sector activity increased again (reopening of hospitality establishments and a significant rise in tourist overnight stays), 2022 recorded a notable increase in waste quantities. From 2022 onward, quantities have remained relatively stable.

In 2024, the total generated quantity amounted to 1,878,802 tons, representing an increase of 2.5% compared to the previous year (Figure 2).

[6] Directive (EU) 2018/851 of the European Parliament and of the Council amending Directive 2008/98/EC on waste

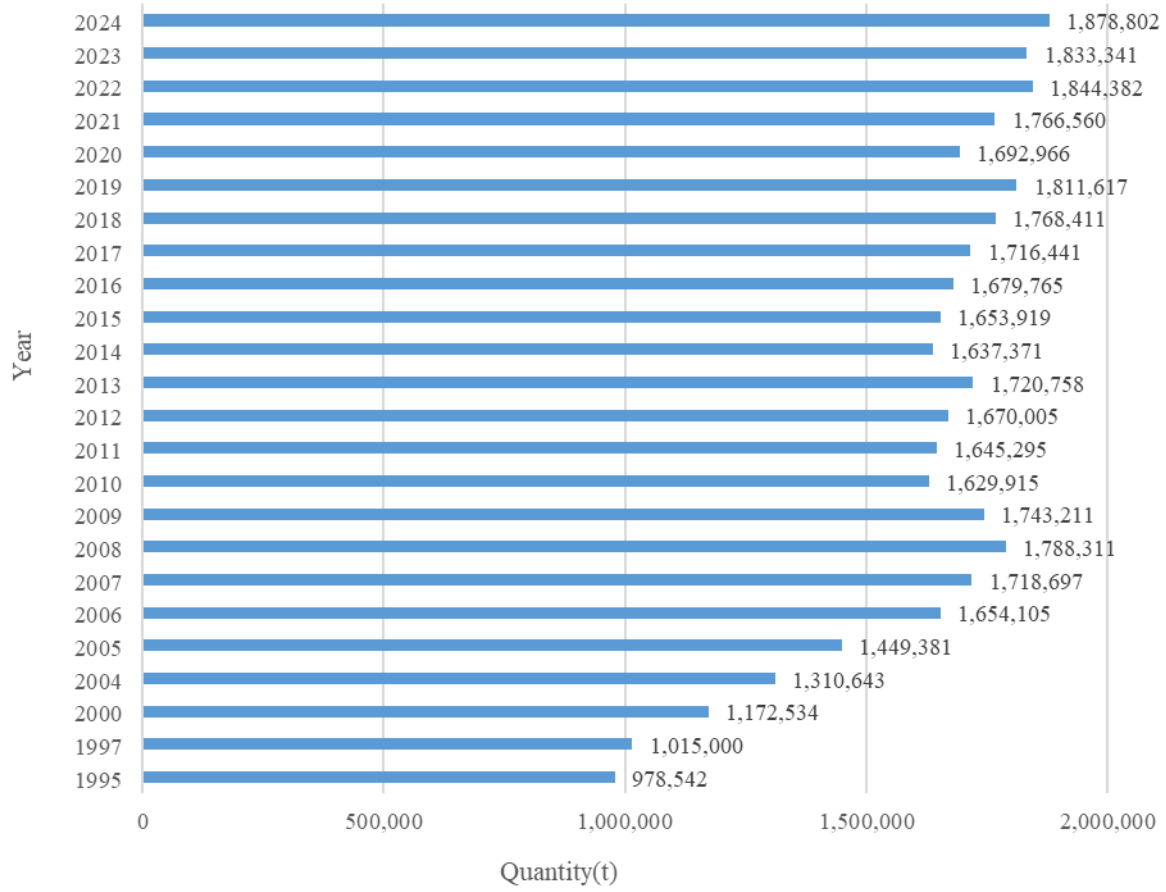


Figure 2 Quantities of generated municipal waste in the Republic of Croatia from 1995 to 2024.

When observing the annual quantity of municipal waste generated per capita, the value for 2024 amounted to 486 kg, representing the highest recorded value since monitoring began in 1995. This can be partly attributed to the use of CBS population estimates (as of 31 December 2023), which resulted in significantly lower population figures compared to the Eurostat estimates used in previous years (Figure 3).

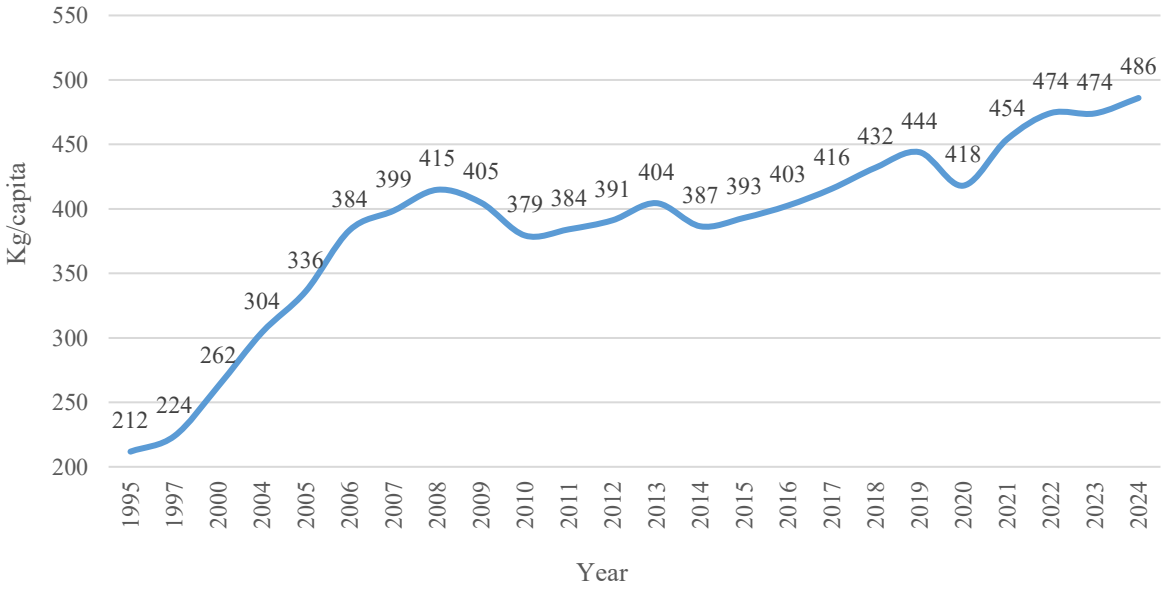


Figure 3 Annual Quantities of Generated Municipal Waste per Capita in the Republic of Croatia, 1995–2024[7]

As a result of more intensive implementation of educational and informational activities aimed at raising citizens' awareness and responsibility, as well as intensified promotion of product reuse, a relative decoupling of economic growth from the amount of generated municipal waste has been observed in the Republic of Croatia from 2017 to 2024. During this period, nominal GDP growth has been notably higher than the increase in municipal waste generation.

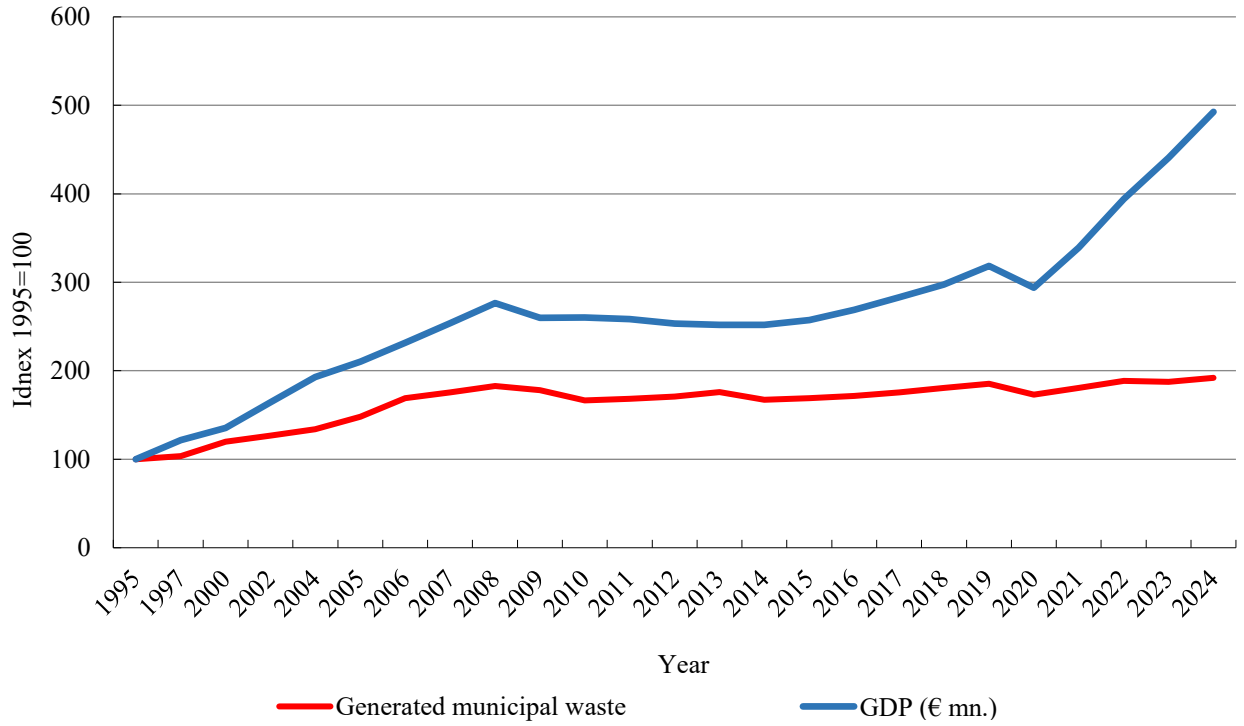


Figure 4 Decoupling of municipal waste generation from economic development, 1995–2024

[7] For the purpose of harmonizing with Eurostat's methodology for determining municipal waste generation per capita, annual Eurostat population data from the database *"Demographic balance and crude rates at national level – average population"* (https://ec.europa.eu/eurostat/data/database) were used up to the 2020 reporting year. For 2021 and 2022, the official 2021 Census preliminary results of the Croatian Bureau of Statistics (CBS) were used, while the final census results were applied for 2023

2.3 Municipal Waste from tourism in Croatia, 2015–2024

As a result of the increase in the number of tourist overnight stays, the amount of municipal waste generated by tourism increased by 93% between 2015 and 2019. In 2020, due to a significant drop in tourist overnight stays caused by the COVID-19 pandemic, the amount of municipal waste from tourism also decreased significantly, reaching levels prior to 2015. From 2021 onwards, with the increase in tourist arrivals, the recorded amount of municipal waste from tourism has also been rising (Table 3).

Table 3 Municipal waste from tourism in Croatia, 2015–2024

Year	Quantity of municipal waste from tourism (t)[8]	Share in total municipal waste	Equivalent to the number of inhabitants
2015	98,960	6.0%	256,374
2016	139,535	8.3%	355,956
2017	155,958	9.1%	374,899
2018	165,251	9.3%	382,525
2019	171,505	9.5%	386,273
2020	83,794	5.0%	200,464
2021	136,512	7.7 %	312,384
2022	181,642	9.9%	383,211
2023	181,977	9.9%	383,918
2024	186,553	9.9%	383,813

[8] The quantities of waste from tourism were determined using the methodology described in the handbook *"Methodological work on measuring the sustainable development of tourism, Part 2: Manual on sustainable development indicators of tourism"*, European Commission, 2006. The source of data on the number of overnight stays was the e-Visitor system (Information System for Tourist Check-in and Check-out).
Data on overnight stays in nautical tourism were not included in the calculations, as it was not possible to allocate them by county. These values are negligible.

2.4 Separately collected municipal waste in the Republic of Croatia from 2010 to 2024

The quantities of separately collected municipal waste (including mixed waste such as bulky waste, etc.) increased from 2010 to 2013. A significant annual increase was recorded in 2012, which was partly due to a methodological change in the calculation, namely the inclusion of municipal waste from the service sector and quantities collected within the special waste categories system organized by EPEEF.

In 2014 and 2015, smaller quantities of separately collected municipal waste were reported, reflecting lower amounts of total municipal waste generated. In 2016, the quantities of separately collected municipal waste exceeded the 2013 levels and have continued to grow steadily since then.

In 2024, a further increase of approximately 5 % compared to 2023 was observed, amounting to 41,938 t.

Table 4 and Figure 5 present the data on separately collected quantities over the observed period.

Table 4. Quantities of separately collected municipal waste, 2010–2024

Year	Separately collected municipal waste (t)
2010	227,651
2011	268,053
2012	382,078
2013	421,182
2014	396,594
2015	391,075
2016	428,466
2017	488,209
2018	553,791
2019	670,769
2020	694,159
2021	761,683
2022	844,387
2023	878,436
2024	920,374

The largest contributions to the increase in separately collected municipal waste compared to the previous year are attributed to separately collected bio-waste (19,935 t), waste plastics (11,198 t), and bulky waste (9,679 t).

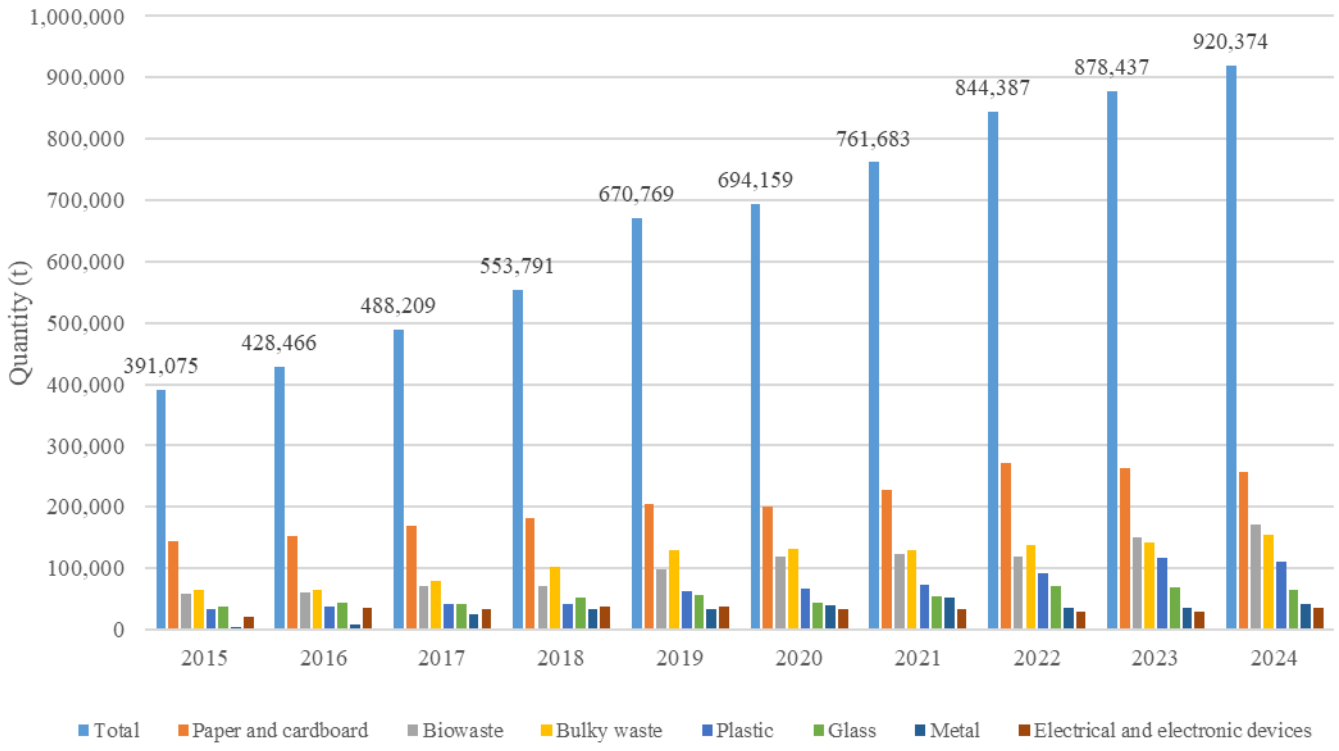


Figure 5 Quantities of separately collected municipal waste in the Republic of Croatia, 2015–2024

The share of separately collected municipal waste (including mixed waste such as bulky waste, street cleaning waste, etc.) in 2024 amounted to 49% (Figure 6), representing an increase of percentage point compared to 2023.

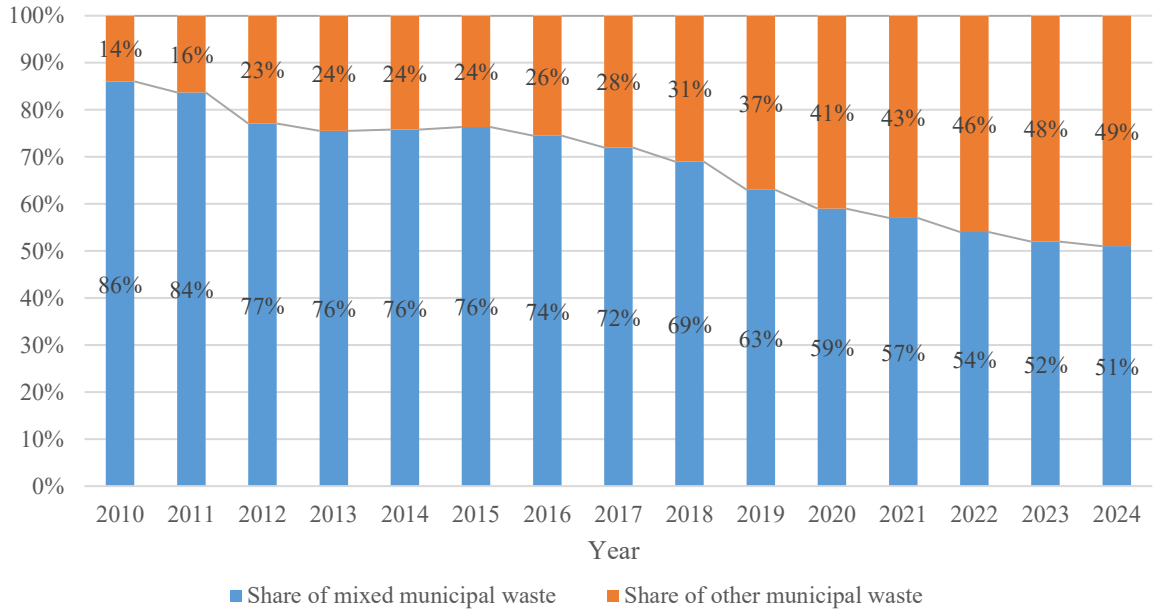


Figure 6 The share of separately collected municipal waste and mixed municipal waste in the Republic of Croatia, 2010-2024

In the period from 2017 to 2024, a significant increase in the share of separately collected municipal waste was observed, rising by 21 percentage points. This increase results from

continuous investments in infrastructure for separate waste collection, such as household-level collection containers, civic amenity sites, collection vehicles, and waste sorting facilities, which were implemented at an accelerated pace during this period.

However, in the last three years, the growth rate of separate collection has slowed somewhat due to contamination present in a significant portion of the separately collected waste, which in such cases is categorized as mixed waste.

The number of local self-government units (hereinafter LSGUs) implementing separate collection increased from 457 in 2017 to 539 in 2024, leaving 17 LSGUs (2%) yet to establish separate collection.

The share of separate collection within the public service in 2024 amounted to 32%, representing an increase of 3 percentage points compared to 2023. The calculation of the separate collection rate within the public service is based on the definition of public service in Article 64 of the Waste Management Act, which includes the collection of mixed municipal waste from households and other sources, biowaste from households, recyclable municipal waste, hazardous municipal waste, and bulky waste from households.

This includes waste with the following key numbers according to the regulation governing the Waste Catalogue:

- all types of waste from subgroup 15 01,
- all types of municipal waste from subgroup 20 01 except waste characterized by key number 20 01 99,
- waste characterized by key numbers 20 02 01, 20 03 01, 20 03 02, 20 03 07.

2.5 Municipal Waste Management in Croatia from 2010 to 2024

The Waste Framework Directive and Commission Implementing Decision (EU) 2019/1004[9] prescribe the methodology for calculating recycling targets, which EU member states are required to apply from the 2020 reporting year onwards. According to this methodology, the mass of recycled municipal waste from 2020 onwards is calculated as the mass of municipal waste that enters the recycling process and is processed into products, materials, or substances that are no longer considered waste. This excludes impurities and non-target materials separated before and during recycling, which are not intended for further recycling.

The share of municipal waste sent for recovery increased from 4% to 30% between 2010 and 2019. These values include non-target materials and impurities. From 2020 to 2024, when the recycling rate is calculated according to the above methodology, the share increased from 30% to 38%.

In 2024, a significant portion of separately collected municipal waste (about 25%) still did not enter recovery but was temporarily stored or sent to landfills. A total of 721,553 tons of municipal waste were recovered.

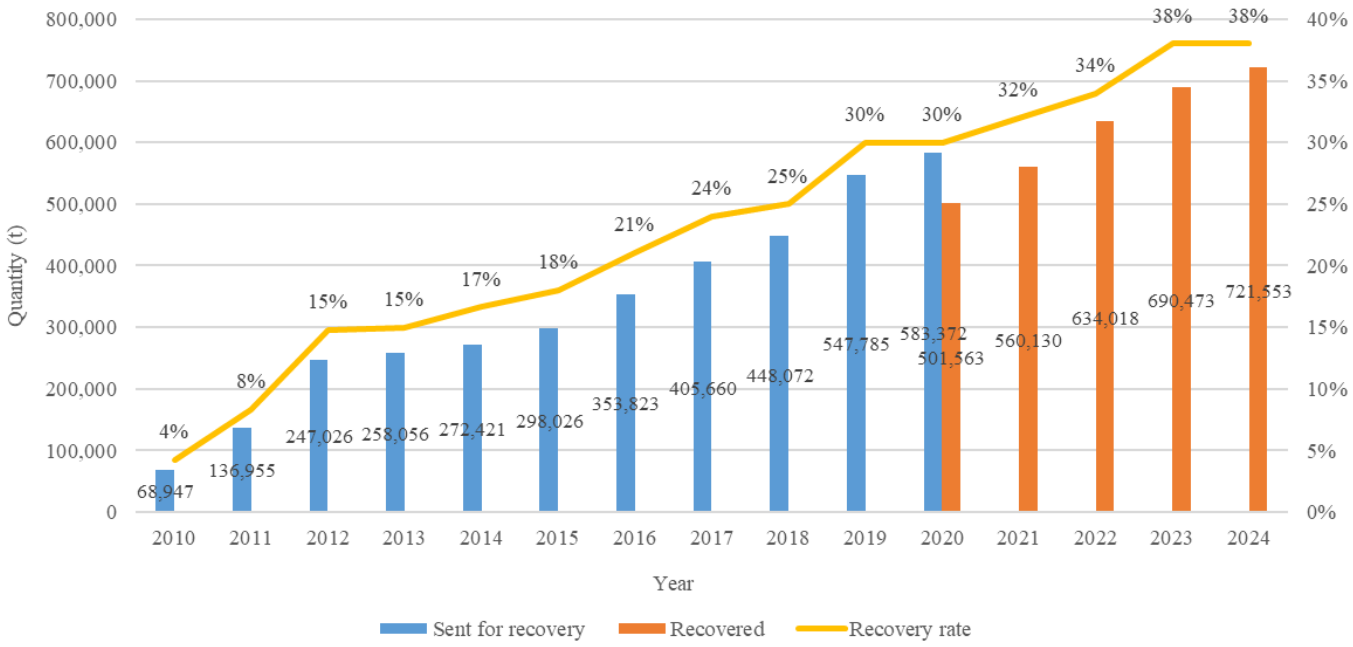


Figure 7 Municipal waste sent for recovery / recovered in the Republic of Croatia, 2010-2024

The recycling rate in 2024 is 37%. A total of 689,593 tons of municipal waste were recycled. The target, which required that by 2020 at least 50% of the total waste generated in households and waste from other sources with similar waste streams to household waste—including at least paper, metal, plastic, and glass—be recovered through recycling and

[9] Commission Implementing Decision (EU) 2019/1004 of 7 June 2019 laying down rules for the calculation, verification, and submission of waste data in accordance with Directive 2008/98/EC of the European Parliament and of the Council

preparation for reuse, was not achieved. The target for 2025 is 55%, for 2030 it is 60%, and for 2035 it is 65%.

The increase in the recycling rate from 2010 to 2024 is 33 percentage points (Figure 8).

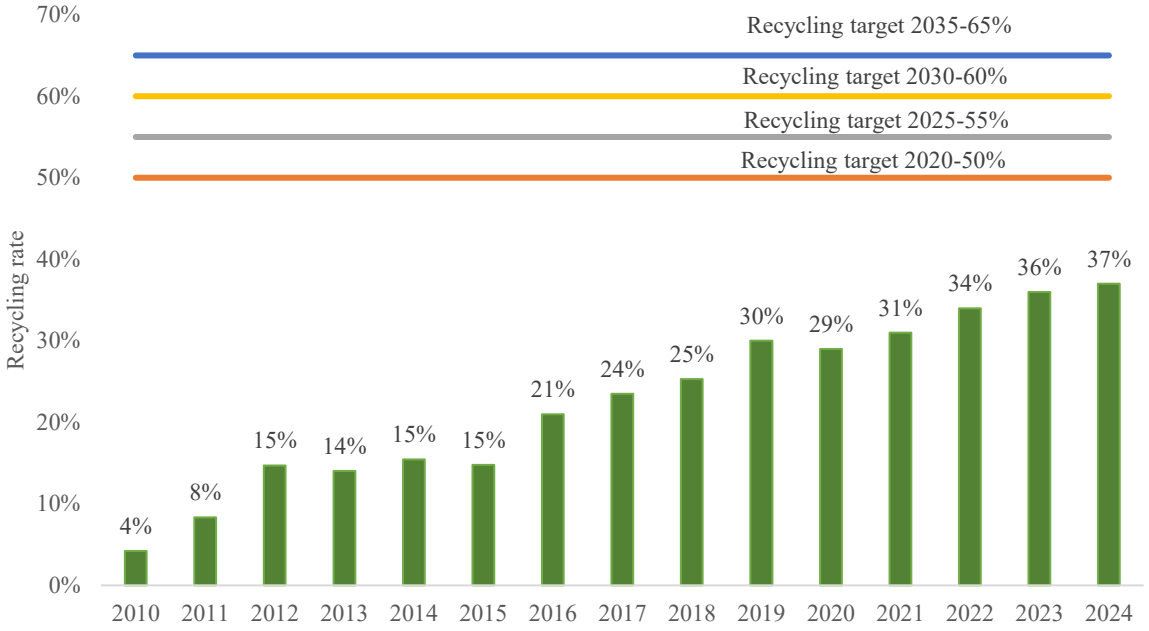
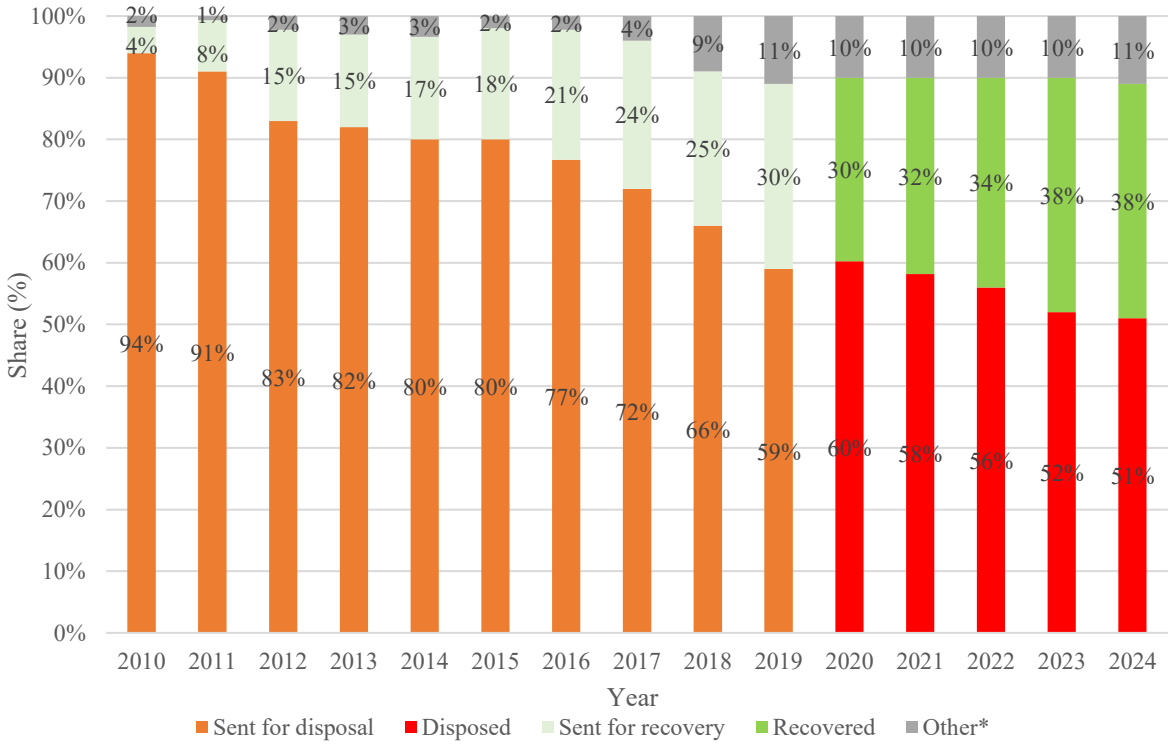


Figure 8 Share of recycling in Croatia in the period 2010–2024 compared to the prescribed targets

Parallel to the increase in the share of municipal waste sent for recovery, the period from 2010 to 2019 saw a decrease in the amount of municipal waste sent for disposal from 94% to 59%. In the 2020 reporting year, when the use of the new methodology for calculating the share of recovery/recycling became mandatory, there was a negligible increase in the share of disposed waste compared to 2019 (by one percentage point), as the disposed quantities also included unwanted materials and impurities separated before and during recycling, which were sent for disposal. Accordingly, in 2020, the share of disposed municipal waste was 60%. In 2024, the share of disposed municipal waste stands at 51%.

In addition to the 51% disposed and 38% recovered municipal waste in 2024, approximately 7% of municipal waste consists of quantities sent for further treatment at bioreactor sites within waste management centers, quantities incinerated without energy recovery, temporarily stored amounts, and estimated quantities for the portion of the population not covered, for which the treatment method could not be determined. The remaining 4% refers to losses of waste mass during waste treatment processes (dust, moisture, etc.) (Figure 9).



** Further processing on bioreactor, D10, temporary storage, estimate for the uncovered part of the population, losses (dust, humidity) etc.*

Figure 9 Share of municipal waste in Croatia by treatment methods, 2010–2024

2.6 Disposal of Municipal Waste in Croatia from 2010 to 2024

From 2005 to 2024, a total of 318 official landfill sites has been recorded and monitored, of which 307 sites had the possibility of municipal waste disposal during that period. In 2024, municipal waste was disposed of at 76 landfill sites.

During 2024, the amount of municipal waste disposed of was 957,094 tons. Accordingly, the rate of disposed municipal waste in 2024 was 51%, which is 1 percentage point lower than in 2023.

The quantities of disposed municipal waste decreased by 40% between 2010 and 2024, which can be attributed to reduced generation of mixed municipal waste and other household waste, the establishment of waste management centers, increased separate collection of certain fractions, and partly to improved data quality due to the introduction of scales at landfills (Figure 10).

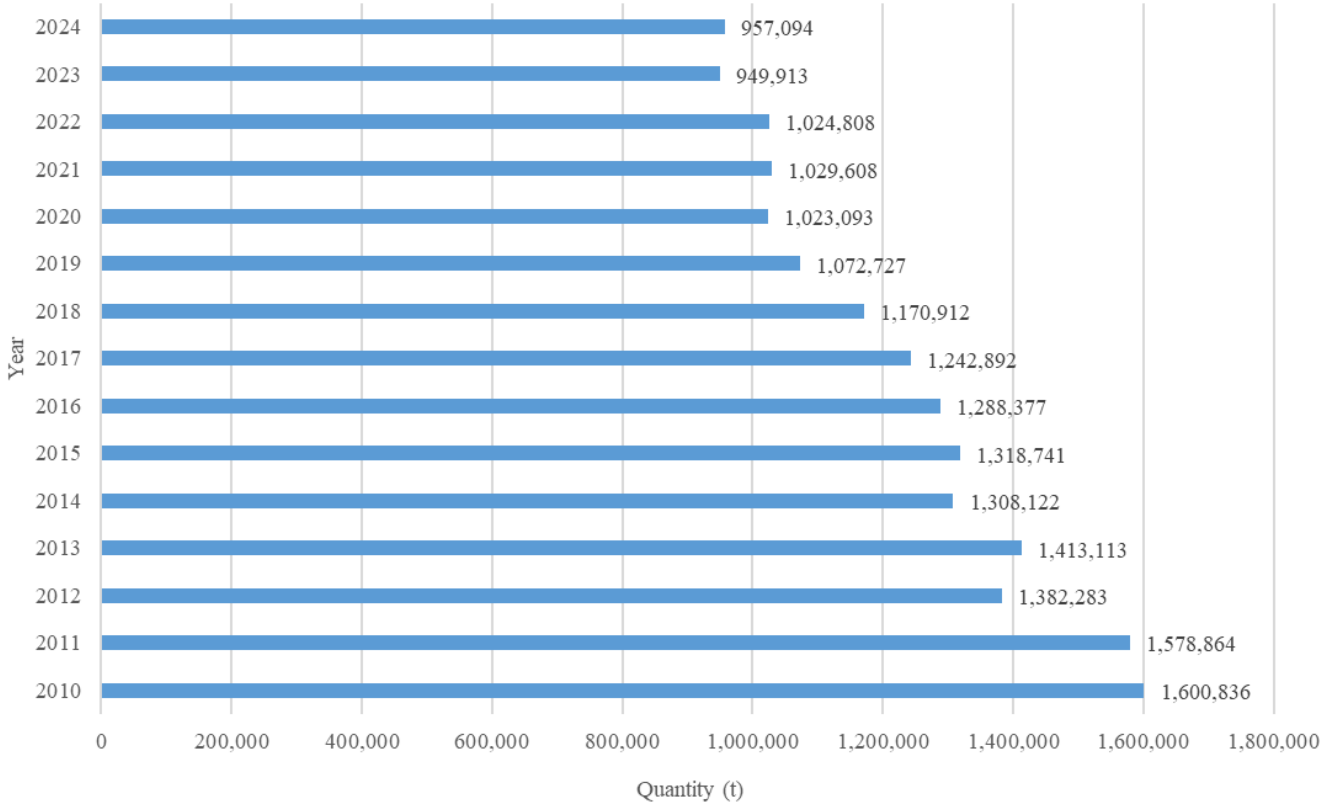


Figure 10 Quantities of disposed municipal waste, 2010–2024

In accordance with the target prescribed by the WMA, the amount of municipal waste disposed of in landfills may be at most 10% of the total municipal waste generated by 2035. Figure 11 provides an overview of the share of municipal waste disposal from 2010 to 2024 in relation to the prescribed target.

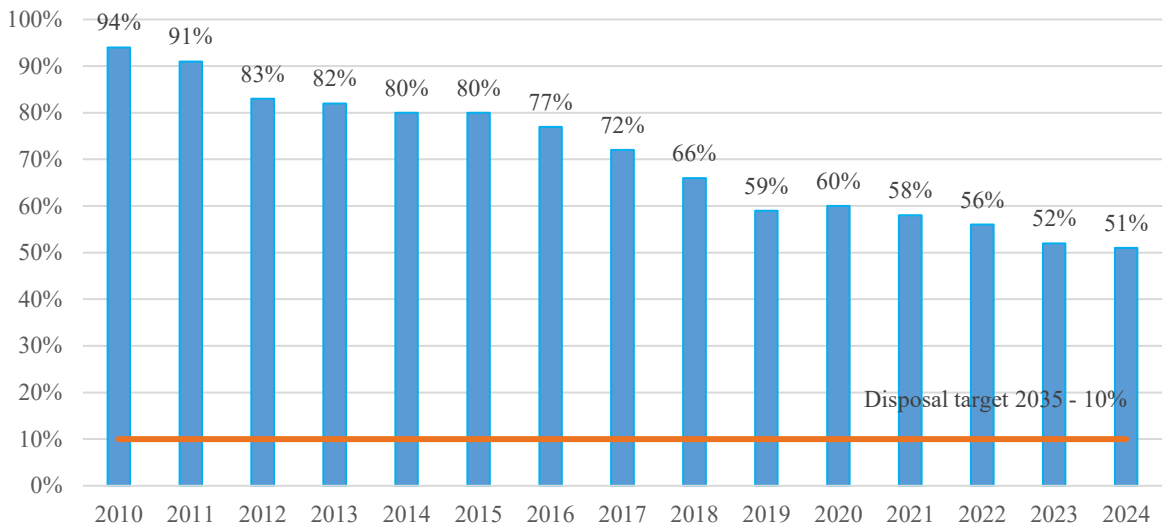


Figure 11 Share of municipal waste disposal in the period 2010–2024 compared to the prescribed target for 2035

2.7 Biodegradable Municipal Waste in Croatia from 1997 to 2024

The Waste Act defines biodegradable municipal waste as any waste, or part of waste, that is subject to anaerobic or aerobic decomposition, such as garden waste, food waste, and paper and cardboard.

Fractions of biodegradable municipal waste should be separated from municipal waste to the greatest extent possible and managed in a way that allows us to achieve the target related to the disposal of biodegradable municipal waste, as prescribed by Article 55 of the Waste Act. According to this article, the maximum allowable mass of biodegradable municipal waste that may be landfilled in a calendar year in accordance with all waste management permits in Croatia is 264,661 tons, which is 35% of the mass of biodegradable municipal waste generated in 1997.

Between 1997 and 2010, the quantities of landfilled biodegradable municipal waste increased along with the increase in generated biodegradable waste. From 2011 onwards, alongside the recorded increase in generated biodegradable waste, the disposed quantities have been decreasing because of the implementation of separate collection and recycling measures for municipal waste. In 2018, two waste management centers (hereinafter WMC) became operational, and in 2023 another WMC was commissioned, further contributing to the reduction of landfilled biodegradable municipal waste. During 2024, the fourth WMC began trial operations. Additionally, certain smaller quantities of mixed municipal waste are directed to mechanical-biological treatment at one privately owned facility.

The quantity of generated biodegradable municipal waste in 2024 amounted to 1,170,636 tons, of which 502,752 tons were landfilled. This represents a 6% decrease compared to 2023, when the landfilled quantity was 536,220 tons. The prescribed target of 264,661 tons was not achieved, as the landfilled amount exceeded the target by 238,091 tons (Figure 12).

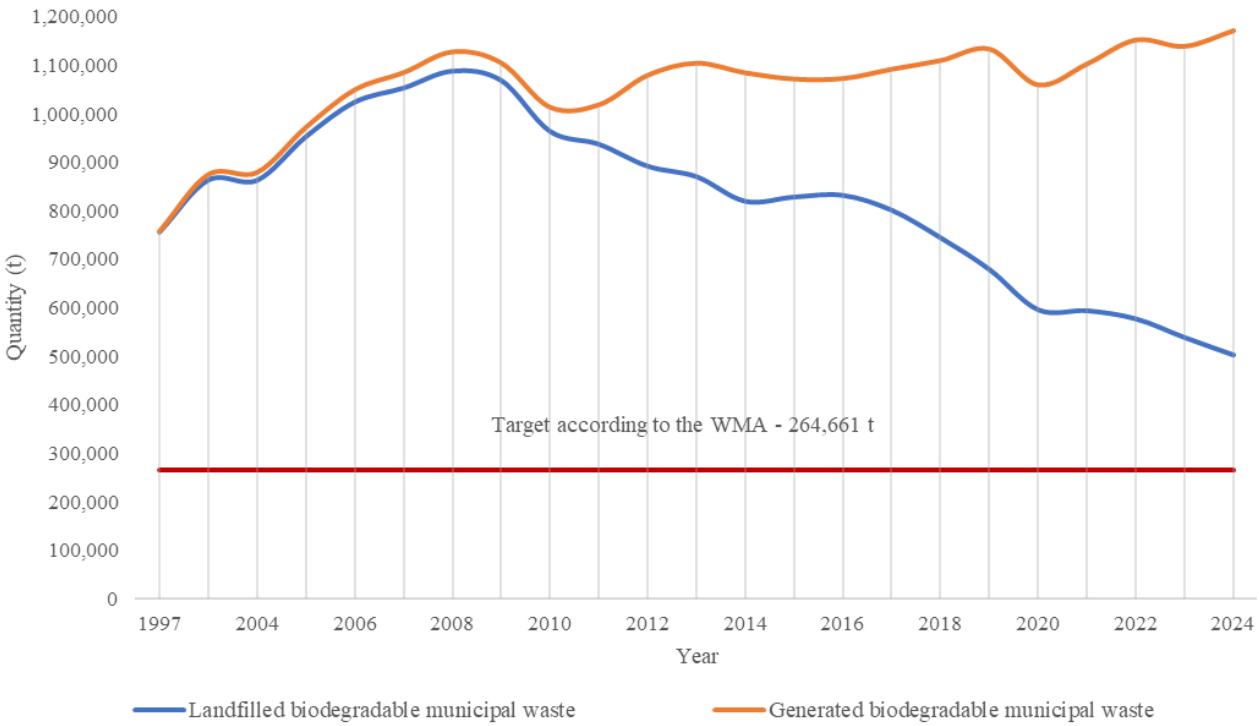


Figure 12 Generated and landfilled biodegradable municipal waste for the period 1997–2024 compared to the targeted amount prescribed by the Waste Management Act

To determine the quantities of generated biodegradable municipal waste for the period 2015–2024, coefficients for calculating the biodegradable component of municipal waste were used from the publication *"Methodology for Determining the Composition and Quantities of Municipal or Mixed Municipal Waste with Guidelines for Ordering and Conducting the Determination of the Average Composition of Municipal or Mixed Municipal Waste"* (Croatian Environment Agency, 2015).[10]

For calculations prior to 2015, coefficients were based on submitted waste composition analyses and/or estimates provided by individual municipal companies, as well as a special coefficient for mixed municipal waste recommended by Eurostat for countries without a defined composition of mixed municipal waste.

Consequently, until 2014, a coefficient of 67% was used for calculating biodegradable waste in mixed municipal waste, while from 2015 onwards, a coefficient of 65% has been applied.

Data on landfilled biodegradable municipal waste up to 2012 are based on landfill reports submitted to the EPR database, while data from 2013 to 2023 are based on landfill operator reports submitted to the Central Information Management System for Landfills (Landfills database – Form OOO). Data for 2024 is based on information submitted by landfill operators in the OOO form integrated within the OZO form in the EPR database, all in accordance with Article 39, Paragraph 5 of the Waste Act.

Operators are recommended to use their own waste composition analysis for calculations if such analysis has been conducted at the landfill.

[10] Methodology_for_determining_the_composition_and_quantity_of_municipal_waste.pdf

2.8 Biowaste in Croatia from 2012 to 2024

The Waste Management Act (WMA) defines biowaste as biodegradable waste from gardens and parks, food and kitchen waste from households, restaurants, catering, retail establishments, and similar waste from the food industry. According to the Waste Catalogue, municipal biowaste includes the following four waste key numbers:

- 20 01 08 – biodegradable waste from kitchens and canteens.
- 20 01 25 – edible oils and fats.
- 20 02 01 – biodegradable waste from gardens and parks.
- 20 03 02 – waste from markets.

After a period of relatively stable biowaste quantities from municipal waste between 2020 and 2023, which amounted to around 494,000 tons, an increase of approximately 7% was recorded in 2024.

In total, 527,000 tons of biowaste from municipal waste were generated in 2024. Of this, 171,807 tons, or 33%, were separately collected, representing an increase of 3 percentage points (22,142 tons) compared to 2023.

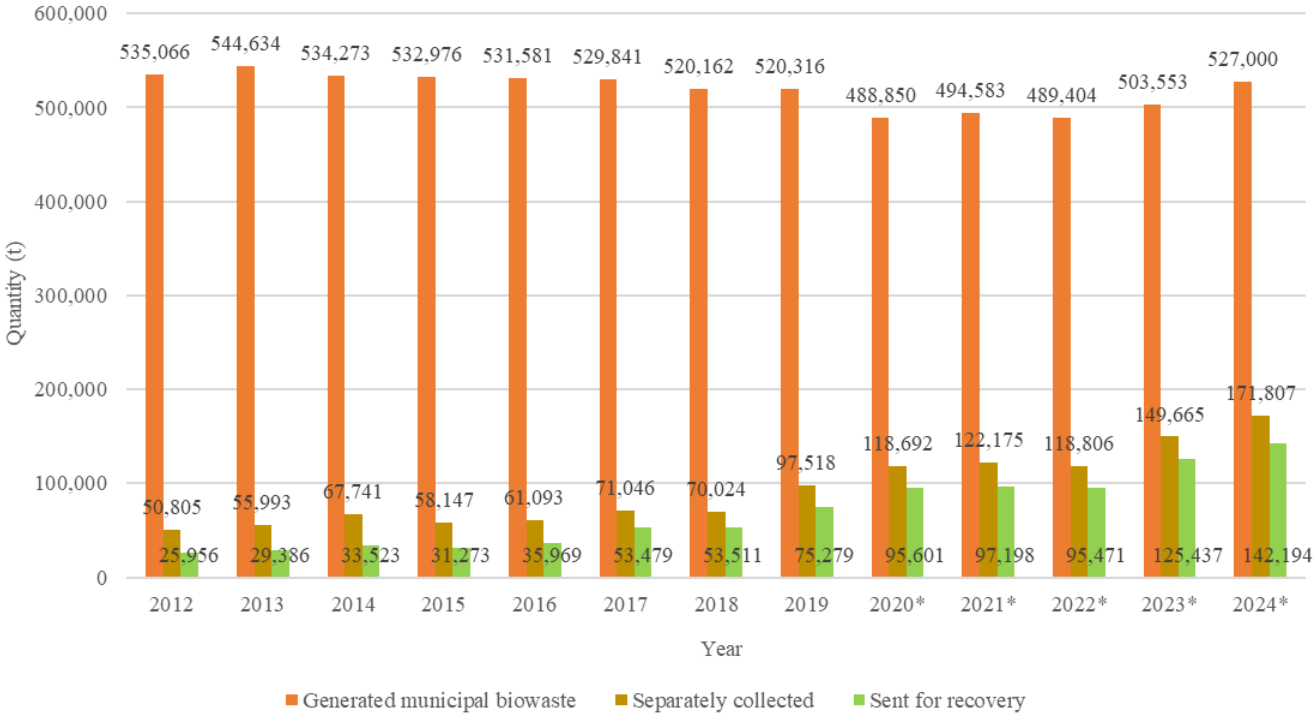
Considering quantities collected as part of public services, the largest contributions to the increase in separately collected biowaste in 2024 compared to the previous year were recorded in: City of Zagreb – increase of 12,541 t; Međimurje County – increase of 1,302 t; Sisak-Moslavina County – increase of 1,146 t; Osijek-Baranja County – increase of 1,145 t.

Separate collection of biowaste was carried out in all counties, covering 270 local self-management units (LGUs), or 49% of all LGUs. This represents an increase of 27 LGUs compared to the previous year (243 LGUs).

It is estimated that in 2024, 282,901 tons of biowaste from municipal waste ended up in landfills (both separately collected and as part of mixed municipal waste), i.e., about 54% of the generated amount, which is 6 percentage points less than in the previous year.

Approximately 27% of the generated biowaste (142,194 tons) was recovered through composting, anaerobic digestion, energy recovery, and other methods, which is 2 percentage points higher than in 2023. The remaining quantities mainly ended up as part of mixed municipal waste in mechanical-biological treatment centers at waste management facilities, with a smaller portion in temporary storage.

Figure 13 shows the quantities of generated, separately collected, sent for recovery/recovered biowaste from municipal waste in Croatia from 2012 to 2024. Data from 2020 onwards refers to recovered/recycled municipal biowaste quantities excluding impurities and non-target materials removed before and/or during recycling, while quantities reported up to 2019 include impurities/non-target materials, i.e., the amounts sent for recovery.



*Recovered quantities, excluding impurities and non-target materials

Figure 13 Generated municipal biowaste and management of the same, 2012-2024

Figure 14 provides an overview of the number of composting and biogas plants that processed municipal waste and the quantities of waste treated in these facilities from 2020 to 2024. During this period, there was a slight increase in the number of composting and biogas plants processing municipal waste. The quantities of waste treated at these facilities are increasing, but still not at a level that would make a significant contribution to achieving the set targets.

The decrease in the quantity of composted waste in 2024 is attributed to methodological changes in 2024, resulting from the alignment of the EPR application with new EU regulations regarding the calculation of recycled waste.

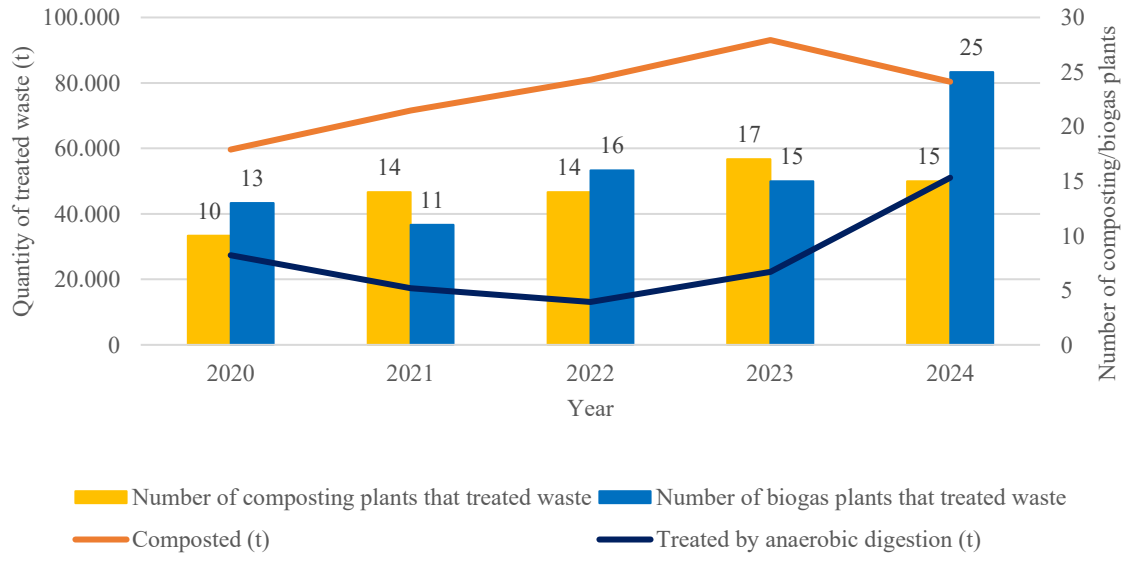


Figure 14 Number of composting/biogas plants that treated municipal biowaste and an overview of the quantities of waste treated in these facilities in the period from 2020 to 2024.

3. Status of the Republic of Croatia in Achieving National and EU Targets Related to Municipal Waste in 2024

Table 4 Status of the Achievement of Prescribed Targets Related to Municipal Waste in 2024

Target	Value for 2024	Status of target achievement
Objective of the WMA (Article 54): - WMA target (Article 54): - At least 50% of the total mass of the waste generated in households and the waste from other sources whose waste streams are similar to household waste streams, which includes at least paper, metal, plastics and glass, shall be recovered through recycling and preparation for re-use.	Recycling rate of municipal waste: 36.7 %	Continued positive progress trend and additional infrastructure conditions established for achieving the target.
Objective of the WMA (Article 55): - The maximum allowed mass of biodegradable municipal waste that may be landfilled in a calendar year, for all waste management licenses in the Republic of Croatia is 264,661 tons, which is 35% of the mass of biodegradable municipal waste produced in 1997, i.e. 35% of the mass of biodegradable municipal waste generated in 1997.	The amount of biodegradable municipal waste landfilled in Croatia: 502,752 t.	The positive trend of progress continues, but the target has not been achieved.

4. Conclusion

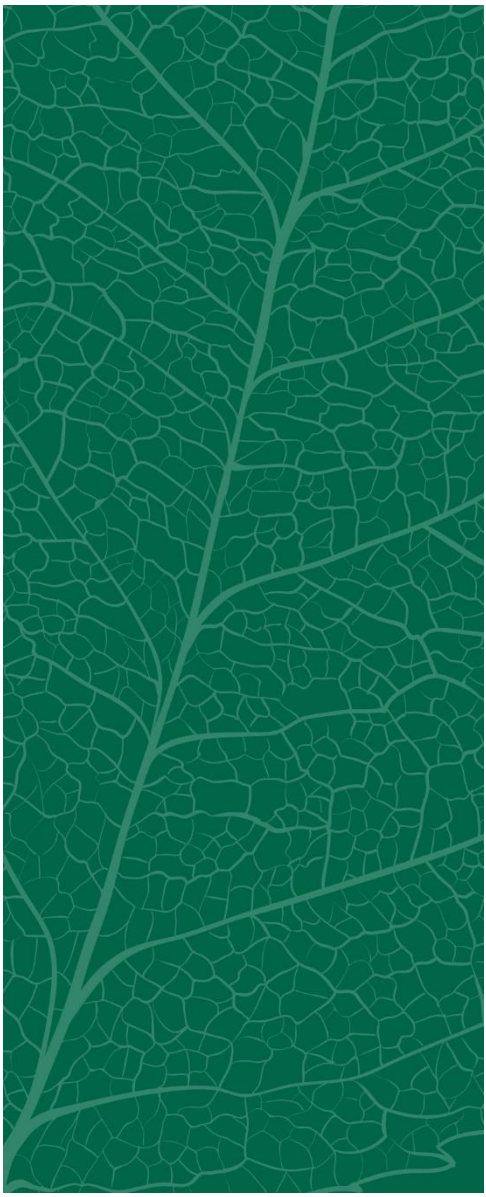
- In 2024, the total amount of municipal waste generated remained largely unchanged compared to the previous year, amounting to 1,878,802 t.
- The trend of decoupling economic growth from municipal waste generation continues.
- The increase in municipal waste generation is slower than the growth of economic indicators.
- Per capita, 486 kg of waste was generated, which is still significantly lower than the EU average of 511 kg in 2023, according to the latest available data.
- Investments in infrastructure for separate collection of municipal waste continue, including curbside collection containers, construction of civic amenity sites, procurement of vehicles, construction of sorting facilities, etc., resulting in an increase in the share of separately collected waste by 1 percentage point compared to the previous year. The separate collection rate was 49%, and only 3% of LGUs have not yet implemented separate collection.
- The recycling rate increased by 1 percentage point, reaching 37%. The statutory target of 50% recycling has still not been achieved. The overall recovery rate remained at 38%, the same as the previous year.
- 51% of the total municipal waste generated was landfilled. By 2035, landfilling of municipal waste needs to be reduced to 10%.
- Regarding the target for reducing biodegradable municipal waste landfilling set out in Article 55 of the WMA, this target was not achieved. In 2024, 502,752 t of biodegradable municipal waste was landfilled, exceeding the prescribed target by 238,091 t.
- In addition to the 51% landfilled and 38% recovered municipal waste, approximately 7% of municipal waste consists of quantities sent for further treatment in bioreactor within waste management centers, quantities incinerated without energy recovery, temporarily stored amounts, and estimated quantities for the population not covered by organized waste collection, and quantities whose waste management could not be determined. The remaining 4% relates to mass losses during waste treatment (dust, moisture, etc.).
- In the upcoming period, it is necessary to continue implementing existing educational and informational activities aimed at preventing waste generation and separating useful waste at the source. Furthermore, it is essential to continue investing in improving existing and constructing additional infrastructure for waste treatment (sorting facilities, biological treatment plants, facilities for recyclable waste tretament, etc.).
- The quality of the data used for this report was assessed as satisfactory. Data was collected in accordance with standard quality criteria defined in the statistical concepts from the Manual on Quality Reports and Metadata of the European Statistical System, ensuring an appropriate level of accuracy, consistency, and comparability over time. Although new data reporting forms were introduced in the reporting year of 2024, requiring adaptation by data providers, it was determined that the changes had only a minor impact on overall reliability, particularly regarding information on impurities and non-target materials in the

waste. Despite significant efforts in educating data providers, minor improvements in data quality are still needed, especially concerning completeness and consistent application of methodological guidelines. Further improvements are planned through continued education and technical support to data providers, which will further strengthen the stability and comparability of statistical results in the coming years.

- The MEPGT continuously implements measures to reduce administrative burdens for data providers, improve data quality, and develop waste statistics through ongoing upgrades of the Waste Management Information System, project implementation, and regular activities, all to ensure reliable monitoring of the waste management situation in Croatia.

5. Figure List

6. Table List



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