2023

Swedish Waste Management

AVFALL SVERIGE

Contents

Preface

We are facing a necessary transition to meet climate targets and conserve resources. All of society has to play its part, and municipalities play a key role as drivers in this development. Avfall Sverige is striving to reduce waste volumes, promote more sustainable production and consumption, increase reuse, and recycle waste in the best possible way from an environmental perspective. This year's statistics show that we are making progress towards our goals! Information on how this has been possible can be found in "Swedish Waste Management 2023".

In 2023, the volume of household waste decreased by 4 percent compared with the previous year. Importantly, the volume of food and residual waste decreased by 2 percent, which brings us closer to Avfall Sverige's 25/25 goal: to reduce food and residual waste by 25 percent by 2025. These decreases reflect an awareness, a will and a commitment to changing our consumption and managing waste.

2023 was dominated by our work to prepare municipalities for their packaging collection responsibilities, which came into force in 2024. By 2027, all municipalities will have to offer their residents kerbside collection – local separation – which is likely to lead to significantly higher amounts of packaging separated for material recycling. Packaging collection has otherwise remained relatively unchanged.

A particularly important success is that the collection of rigid plastic for material recycling increased significantly in 2023, by as much as 30 percent. More than half of the municipalities have introduced rigid plastic as a separate fraction to increase material recycling, and many more are in the starting blocks. This represents a significant gain for both the environment and the climate. An important parameter is increased demand for and disposal of rigid plastic. Avfall Sverige is working intensively to encourage fossil-free energy recovery – we are advocating for policy instruments such as quota obligations, plastic responsibility, etc. to reduce the volume of plastic that enters our waste streams. Initiatives such as the "Stop non-recyclable plastic" (Stoppa fulplasten) campaign have been at the heart of our efforts to increase recycling.

Read more about developments in Swedish waste management and its practical aspects in "Swedish Waste Management 2023". It also contains the latest statistics collected from all municipalities in Sweden.

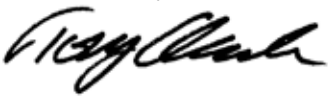
EXTERNAL FACTORS 2023

International collaboration gained momentum in 2023. Within the framework of the United Nations Development Programme (UNDP), a digital training course on sustainable waste management was launched as well as a Sida-funded project to strengthen waste management in Ukraine, which has been run by Avfall Sverige together with Salar International. A collaboration with the Swedish Institute resulted in an exhibition on the Swedish waste sorting signage system, which toured Swedish embassies around the world.

At the national level, several important decisions have been made. The Government decided on separate sorting and collection of textile waste from 1 January 2025. The tax exemption for Swedish biogas was eliminated, which led to a sharp increase in biogas prices. As mentioned, plastics remained a key issue, and while collection for material recycling has increased, just as much plastic still ends up in energy recovery. This makes CCS (carbon capture and storage) an important issue to pursue.

Waste is a reflection of societal development. Both municipal and private actors have to take responsibility so that the trend of reduced volumes that we are now seeing can continue. In parallel, technology is being developed to increase material recycling and energy recovery, often with municipal waste operations as development platforms and catalysts.
Together with our members, Avfall Sverige is well positioned to work towards a sustainable future and achieve the EU's climate targets.

Malmö, 1 July, 2024



Tony Clark, Managing Director Avfall Sverige

How Swedish waste management works

Preventing the creation of waste is the top step in the waste hierarchy. It is the priority of both Swedish and European waste legislation.

The waste hierarchy order of priority is:
- waste prevention
- reuse
- material recycling and biological treatment
- other recycling, e.g. energy recovery
- disposal, e.g. to landfill.

According to the definition in the Swedish Environmental Code,[1] waste is any object, matter or substance belonging to a specific waste category which the holder disposes of or intends or is required to dispose of.

There are different methods for treating waste[2]:
- material recycling
- biological treatment
- energy recovery
- landfill.

Hazardous waste can be treated using one or more of these methods, depending on its properties. Waste that may contain hazardous substances should not undergo material recycling, but should instead be phased out of the eco-cycle. Recycling means that the waste will be used as replacement for another material or other fuels.

Preparation for reuse is also a recycling process. According to the definition, preparation for reuse means inspecting, cleaning or repairing any item that is waste so it can be reused without further treatment.

Material recycling saves energy and natural resources, thereby reducing environmental impact. Biological treatment closes the eco-cycle's loop, produces electricity and biogas, and returns nutrients to the soil in the form of digestate. Energy recovery refers to the extraction of energy from waste to provide both district heating and electricity. Landfill entails waste being stored in a manner that is safe in the long-term.

THE RESPONSIBILITIES OF MUNICIPALITIES

Under the Swedish Environmental Code, each municipality is responsible for ensuring that municipal waste[3] within the municipality is transported and recycled in the best possible way or disposed of. Municipal waste refers to waste from households and waste that is similar in nature and composition to waste from households, such as waste from restaurants, shops, offices, etc.[4]. Certain types of waste are not municipal waste if going strictly by the definition, but are included in municipal responsibility for collection, recycling, etc. These include sewer fractions from private sewers, and construction and demolition waste not produced by professional operations. In this publication, we use the term household waste for the waste generated by households and businesses that falls under municipal waste responsibility pursuant to Chapter 15, § 20 of the Environmental Code.

Waste hierarchy

1 Swedish Environmental Code (1998:808), Chapter 15, § 10
2 Avfall Sverige Report 2017:23 Right item to the right treatment. Material recycling, waste incineration and the detoxification of society
3 The Swedish Environmental Protection Agency has drawn up a guide to the definition of municipal waste, and Avfall Sverige has drawn up a guide on the meaning of the term municipal waste (guide #25)
4 However, it does not include waste from manufacturing, agriculture and forestry, fishing, septic tanks, sewage tanks and sewage treatment, construction and demolition waste, and end-of-life vehicles.

Every municipality is required by law to have its own waste and sanitation ordinance, which consists of a waste plan and regulations for waste management[5]. Municipalities can collaborate and draw up common regional waste plans.

The municipalities are working at increasing rates to promote the prevention and reuse of waste. Preparation for reuse of household waste is part of the municipal responsibility. The municipalities also have a duty to inform about waste management and about the content of the waste plans.

THE RESPONSIBILITY OF PRODUCERS

Sweden has producer responsibility for, among other things:

- packaging
- waste electrical and electronic equipment (WEEE)
- tyres
- cars
- batteries
- pharmaceuticals.

A producer is an entity that imports, produces or otherwise puts a product on the market. Producers are responsible for collecting and disposing of end-of-life products, usually through so-called material companies created for different producer responsibilities. This means that there must be suitable collection systems and treatment methods for recycling. However, from 1 January 2024, municipalities will be responsible for collecting packaging waste, but producers will remain responsible for recycling it.

Producer responsibility is also intended to encourage producers to develop products that are more economic with resources, easier to recycle and do not contain substances which are harmful to the environment. In their information about waste, the municipalities are also obliged to inform about the responsibility of producers. This is done, inter alia, through the national waste portal sopor.nu, which is a collaboration between Avfall Sverige and several other actors.

THE RESPONSIBILITY OF HOUSEHOLDS

Households are responsible for separating and depositing waste at available collection points. They must also follow the municipality's rules for waste management.

THE RESPONSIBILITY OF BUSINESSES

Businesses are responsible for disposing of non-household waste and waste that does not fall under municipal or producer responsibility.

ORGANISATIONAL STRUCTURES

The municipalities must choose themselves how waste management is organised. Local government autonomy is part of the Swedish Constitution.

There are several organisational structures available:

- self-administration
- municipal enterprise, owned independently or jointly with other
- joint board
- municipal association.

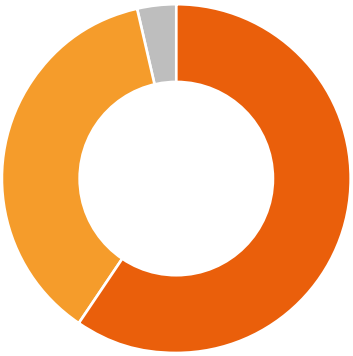
The waste sector has a long history of collaboration between municipalities. As the sector has faced greater and greater demands, the collaborations have grown in scope and have undergone development and expansion. Collaboration between municipalities is a natural operational structure, providing the greatest possible environmental and social benefit, managing waste cost effectively and ensuring the requisite competencies are in place. Municipalities can also cooperate in relation to specific issues, such as joint procurement.

PRIVATE CONTRACTORS OR IN-HOUSE

In 60 percent of the country's municipalities, the collection of food and residual waste is carried out by private contractors. 37 percent of municipalities carry out collection themselves, and the others use a combination of private contractors and in-house collection services. There has been a clear increase in the number of municipalities carrying out collection in-house as the proportion was 25 percent in 2014. This follows an international trend and stems from the municipalities' desire for greater flexibility and decision-making power. Waste treatment is either undertaken by the municipalities themselves, or by an external contractor (chosen in a procurement procedure), which can be a different municipality, a different municipal enterprise or a private company. The distribution between the various structures depends on the method of waste treatment.

5 Avfall Sverige Report 2017:01 Basis for the waste disposal regulations in the Municipal Waste regulation Ordinance

Service providers for the collection of food and residual waste 2023

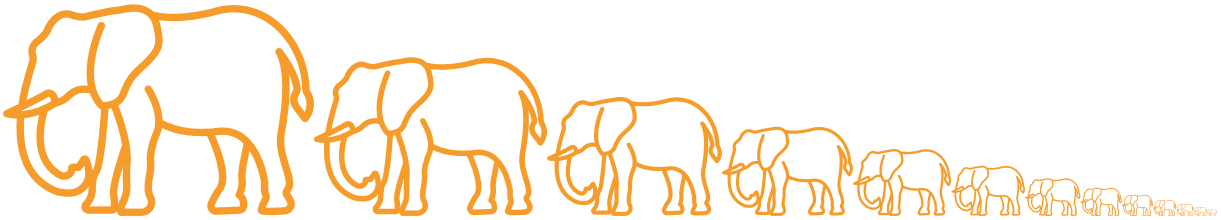


	Percentage of municipalities
Solely private contractors	60%
Solely in-house	37%
Combination of in-house and contractors	3%

Waste management organisation 2023

Breakdown of responsible organisation	Municipalities Number	Percentage
Municipal self-administration	105	36%
Municipal association	50	17%
Joint board	11	4%
Municipal enterprise, wholly-owned	53	18%
Municipal enterprise, partially-owned	71	25%

There are also regional companies that do not officially take over the municipal waste responsibility, e.g. Sysav, Renova and Sörab. However, Sysav is in charge for three municipalities. A total of 30 municipalities cooperate in such regional companies.



Just over 1.5 million tonnes of residual waste was collected in 2023.

That is as much as the weight of 300,000 elephants.

If these elephants were to stand in a line, they would reach from Sweden's southernmost point to its northernmost point.

Waste volumes

The volumes of collected and treated household waste[6] from households and businesses amounted to 4.5 million tonnes in 2023. For the population as a whole, every Swede generated 431 kg of household waste, which is a four percent decrease compared to 2022.

In 2023, 27 percent, 1.2 million tonnes, went to material recycling, including the recycling of construction material. This corresponds to 118 kg per person and is a four percent decrease compared to 2022. 687,940 tonnes, 15 percent, were sent to biological treatment. This corresponds to 65 kg per person, which is a six percent decrease compared to 2022.

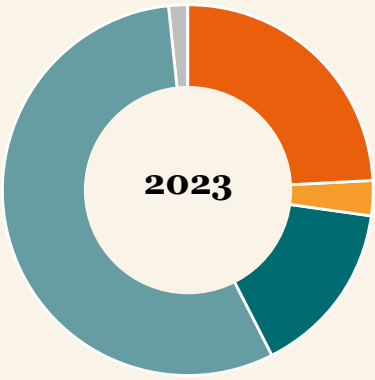
Energy recovery decreased by 3 percent compared to 2022, amounting to 2.5 tonnes, or 242 kg per person. Energy recovery accounts for 56 percent of treatment. Landfill decreased by 11 percent to 67,600 tonnes, which corresponds to 6 kg per person. Landfill accounts for 1.5 percent of the total amount of the waste managed.

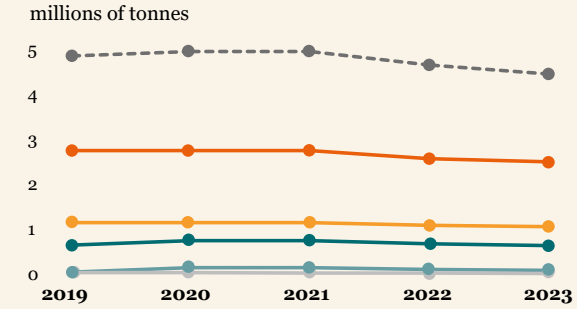
In 2023, just over 1.5 million tonnes of residual waste was collected, which represents 34 percent of the household waste collected. Residual waste refers to the regular rubbish bag, which is sent for incineration with energy recovery. Food waste including home compost amounts to 465,000 tonnes, corresponding to 10 percent of household waste. Food waste is mainly treated through anaerobic digestion to obtain digestate and biogas.

36 percent of the household waste collected consists of bulky waste, 1.6 million tonnes. This is a decrease of 6 percent compared to 2022. On average, 40 percent of the bulky waste went to material recycling, including biological treatment of garden waste, such as scrap metal, rigid plastic, corrugated cardboard, textile waste, flat glass and gypsum. 56 percent of the bulky waste went to energy recovery and 4 percent to landfill.

15 percent consists of packaging and recyclable paper from households and amounted to 672,000 tonnes in 2023, a decrease of 3 percent compared to 2022. This figure does not include packaging waste from businesses, unless it is disposed of at recycling stations.

Waste trends 2019–2023





Total volume of waste treated
Energy recovery
Material recycling
Biological treatment
Recycling of construction material
Landfill

The statistics on municipal waste are mainly taken from Avfall Sverige's "Avfall Web" system. Some data are obtained from producer organisations. Avfall Web is a tool used by the municipalities for development, benchmarking and statistics. Municipalities and treatment plants report information on waste management and the volumes collected and treated.

6 In this publication, the term household waste refers to the waste generated by households and businesses that falls under municipal waste responsibility pursuant to Chapter 15, Sections 20 and 20a of the Swedish Environmental Code. Compared with the concept of municipal waste, construction and demolition waste from households is included, while waste from park and street maintenance is not included. Sludge and other fractions from private sewers are also included in the municipal waste responsibility, but these volumes are not included in the compilation here. However, this publication does contain a chapter on Sludge.

MUNICIPAL WASTE

The Swedish Environmental Protection Agency compiles annual data on municipal waste. As of 2020, all EU Member States must report municipal waste based on a common definition. According to EU regulation, statistics on municipal waste are independent of whether public or private actors are responsible for managing the waste. This allows EU countries to report municipal waste and recycling rates in the same way.

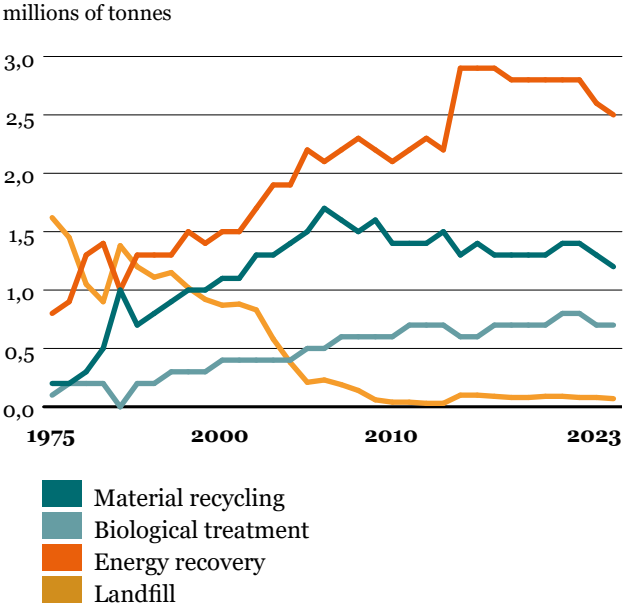
According to the latest statistics from the Swedish Environmental Protection Agency, 4.1 million tonnes of municipal waste were generated in Sweden in 2022, corresponding to 395 kg per person[7]. This is a decrease of 7 percent compared to 2020. 2.2 million tonnes were collected in separate fractions (such as packaging and food waste) and 1.7 million were collected and treated as residual waste. Municipal waste is mainly waste from households (81 percent), but also arises from businesses (19 percent), such as food waste, residual waste and packaging from restaurants and shops. 59 percent of the municipal waste generated went to energy recovery in 2022.

In 2022, only about 40 percent of municipal waste was actually recycled or prepared for reuse. By 2025, at least 55 percent by weight of the municipal waste generated is to be prepared for reuse or recycled, according to the EU recycling target, which is also a national milestone in the Swedish environmental objectives system.

In 2020, Europeans generated an average of 521 kg of municipal waste per person, of which 49 percent went to preparation for reuse or to recycling, while around 23 percent was landfilled.

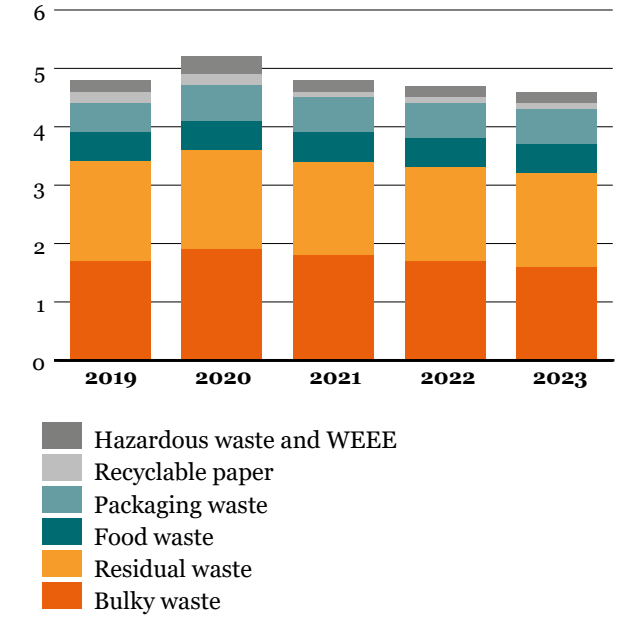
We use the term household waste to refer to the waste generated by households and businesses that falls under municipal waste responsibility pursuant to Chapter 15, § 20 of the Swedish Environmental Code. Compared with the concept of municipal waste, construction and demolition waste from households is included, while waste from park and street maintenance is not included. Food waste includes home compost and waste from food waste disposers sent to the sewer system.

Overview 1975–2023



As of 2014, the data is retrieved from the municipal section of Avfall Web and refers to the intended treatment method. Before 2014, the data was retrieved from the treatment plants.

Volume of household waste collected 2019–2023



7 https://www.naturvardsverket.se/4b01c2/globalassets/data-och-statistik/avfall/kommunalt-avfall-statistikblad.pdf

Treated volumes of household waste 2019–2023

Tonnes	2019	2020	2021	2022	2023
Material recycling	1,165,150	1,227,310	1,198,780	1,136,910	1,105,360
Recycling of construction material	146,790	172,990	162,310	160,430	138,790
Biological treatment*	718,690	757,510	753,282	729,310	687,940
Energy recovery	2,750,430	2,782,720	2,763,640	2,616,450	2,548,260
Landfill	85,390	93,900	81,050	76,390	67,610
Total volume treated	**4,866,450**	**5,034,430**	**4,959,062**	**4,719,490**	**4,547,960**

kg/person	2019	2020	2021	2022	2023
Material recycling	113	118	115	108	105
Recycling of construction material	14	17	16	15	13
Biological treatment*	70	73	72	69	65
Energy recovery	266	268	264	249	242
Landfill	8	9	8	7	6
Total volume treated	**471**	**485**	**474**	**449**	**431**

Proportion, %	2019	2020	2021	2022	2023
Material recycling	23.9%	24.4%	24.2%	24.1%	24.3%
Recycling of construction material	3.0%	3.4%	3.3%	3.4%	3.1%
Biological treatment*	14.8%	15.0%	15.2%	15.5%	15.1%
Energy recovery	56.5%	55.3%	55.7%	55.4%	56.0%
Landfill	1.8%	1.9%	1.6%	1.6%	1.5%
Total volume treated	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

The data was obtained from Avfall Web's municipal section and shows which treatment method was applied to the collected household waste.
* Includes home-composted food waste, but not home-composted garden waste

Volume of household waste collected 2019–2023

Tonnes	2019	2020	2021	2022	2023
Bulky waste	1,730,570	1,909,360	1,849,660	1,717,870	1,622,620
Residual waste	1,744,800	1,669,090	1,638,050	1,595,590	1,558,990
Food waste*	454,410	463,010	482,202	467,860	464,720
Packaging waste	511,070	560,730	596,370	567,790	561,930
Recyclable paper	189,380	168,400	148,950	127,420	110,530
Hazardous waste and WEEE	236,220	263,840	243,830	242,970	229,170
Total volume collected	**4,866,450**	**5,034,430**	**4,959,062**	**4,719,500**	**4,547,960**

kg/person	2019	2020	2021	2022	2023
Bulky waste	168	184	177	163	154
Residual waste	169	161	157	152	148
Food waste*	44	45	46	44	44
Packaging waste	49	54	57	54	53
Recyclable paper	18	16	14	12	10
Hazardous waste and WEEE	23	25	23	23	22
Total volume collected	**471**	**485**	**474**	**449**	**431**

Proportion, %	2019	2020	2021	2022	2023
Bulky waste	35.6%	37.9%	37.3%	36.4%	35.7%
Residual waste	35.9%	33.2%	33.0%	33.8%	34.3%
Food waste*	9.3%	9.2%	9.7%	9.9%	10.2%
Packaging waste	10.5%	11.1%	12.0%	12.0%	12.4%
Recyclable paper	3.9%	3.3%	3.0%	2.7%	2.4%
Hazardous waste and WEEE	4.9%	5.2%	4.9%	5.1%	5.0%
Total volume collected	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

* Includes home-composted food waste.
Data on volumes of household waste collected comes from Avfall Web's municipal section.

Prevention and reuse

Preventing the creation of waste is the first step in the waste hierarchy. It is the priority of both Swedish and European waste legislation.

PREVENTION LEADS TO THE GREATEST ENVIRONMENTAL BENEFIT

Preventing waste means both reducing waste volumes and reducing the number of hazardous substances in the waste, which must occur during the production stage. The municipalities play an important role in this work, but producers must also take prevention into account when designing the products.

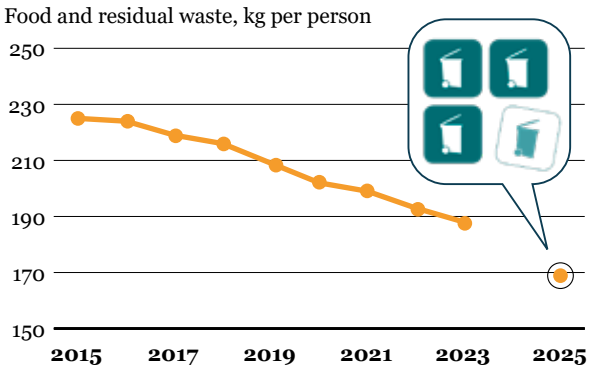
25/25 GOAL

Avfall Sverige has set a goal: to reduce the total volume of food and residual waste by at least 25 percent per person (compared to 2015) by the year 2025 – our 25/25 goal. The purpose of the goal is to increased our pace as we climb up the waste hierarchy. The goal is voluntary for all municipalities to take on. Just over 90 municipalities had made a commitment to work towards this goal by mid-2023. In 2015, the volume of food and residual waste was 225 kg per person nationally. 25 percent represents a reduction of 56 kg, making the remaining volume of food and residual waste 169 kg. By 2023, the volume of food and residual waste decreased by 16 percent (37 kg per person) to 188 kg.

TOOLS FOR PREVENTION

Avfall Sverige is continuously striving to develop aids and support – tools – to help municipalities in their efforts to prevent waste and increase reuse. All of these tools are available in Avfall Sverige's digital toolbox. One of the tools is a working method that involves working with waste prevention in a structured manner within a municipal organisation. The method has been used by many municipalities, and yielded results in terms of reduced waste volumes and costs, as well as a better working environment and better organisation. The work method is described in a handbook[8] that is also used in Avfall Sverige's waste prevention course. There are also many reports describing good examples from municipalities working according to the method or preventing waste in some other way. An important part of preventing waste is measuring and monitoring the work. Tips and advice on how to do this can be found in a guide[9].

Follow-up of 25/25 goal



Experience has shown that a key factor for success in active waste prevention is that decisions are made at both the managerial and the political level. To support administrators in communicating the message of waste prevention, Avfall Sverige has commissioned the production of material called Increasing the pace up the ladder[10]. It consists of a guide and a presentation with a flipchart, where the person who wants to talk about prevention can select the relevant images.

All municipalities are obliged to draw up a waste plan that includes waste prevention. The work with municipal waste plans has been compiled in a report[11], which can also be used in waste prevention work. An obligation, implemented in 2020, is that all municipalities must provide information to households on waste prevention measures. The waste charge may be used to fund these information initiatives. The Swedish Environmental Protection Agency's guide[12] contains a lot of tips and support. Avfall Sverige has several reports on reducing household waste, including a compilation of more than 60 proposals for measures[13] and a report consisting of proposals for measures based on research findings[14].

8 Handbook on resource-smart material use in the municipality – method and inspiration for waste prevention (2023)
9 Avfall Sverige Report 2021:16 Measurement and follow-up of waste prevention in businesses
10 Avfall Sverige Report 2021:14 Increasing the pace up the ladder, Guide and Report 2021:13 Good examples
11 Avfall Sverige Report 2019:25 Waste prevention and reuse in municipal waste plans
12 https://www.naturvardsverket.se/vagledning-och-stod/avfall/informera-hushall-om-avfallsforebyggande-atgarder/
13 Avfall Sverige Report 2023:03 Municipal measures to reduce household waste – and facts on prevention
14 Avfall Sverige Report 2023:12 Reducing household waste – research-based strategies and measures for the municipality as an actor

Avfall Sverige also works a lot with communication on prevention, for example by focusing on "invisible waste", i.e. waste that arises during production and that the consumer does not see. The volume of this waste is often significantly larger than the actual product when it becomes waste. For example, a mobile phone, which weighs about 200 grams, generates 86 kg of waste during production. Expanding waste prevention to the production stage will lead to significant environmental benefits. Campaign material on invisible waste has been developed and is available.

Other communication material that has been produced is "10 ways to reduce your waste" (10 sätt att minska ditt avfall). The material presents 10 simple ways for private individuals to reduce their waste. The material consists of several films and graphic products that can be used in several different ways. There are tips for reducing both food and residual waste, and the material is well suited for use with the 25/25 goal and other initiatives.

Avfall Sverige is the national coordinator of the EU project "European Week for Waste Reduction", which is also supported by the Swedish Environmental Protection Agency. The project runs for one week in November, when activities aimed at reducing the amount of waste and the quantity of hazardous substances in waste are arranged all over Europe. This campaign can also be used by the municipalities in their work to reduce waste. Information on the project is available at avfallsverige.se and ewwr.eu.

There are several other tools that can help with waste prevention, such as a guide to reducing the use of single-use plastics at various events[15]. The guide describes a deposit system with reusable materials as an alternative to single-use plastic. Another tool describes how to reduce the amount of paper advertising sent to the municipality[16].

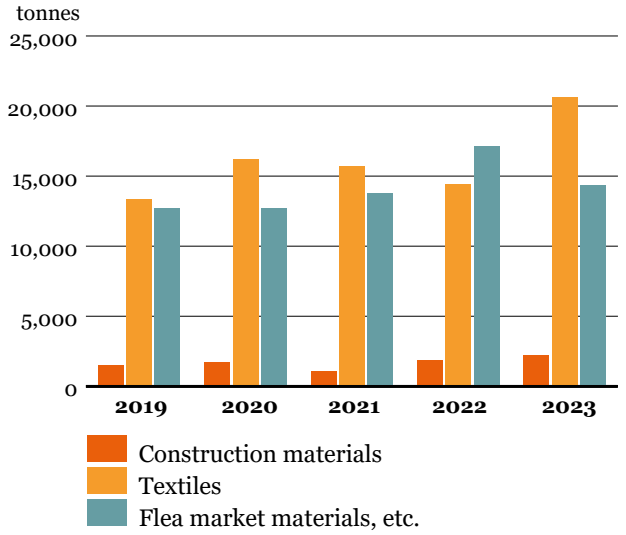
REUSE

The term reuse means that a product is used again instead of being thrown away. Waste can be prepared for reuse through inspection, cleaning or repair.

At present, 72 percent of the recycling centres have some form of means for accepting materials for reuse, often a simpler receiving area in partnership with aid organisations. There are also recycling centres that have expanded operations to include repairs and sales. Several municipalities have plans to develop their recycling centre into a centre for repair, rental, and exchanging and sharing activities[17].

To facilitate the prevention and reuse work of the municipalities, Avfall Sverige has published a guide that explains

Materials collected for reuse 2019–2023



The diagram shows the volumes that the municipality itself, or in cooperation with reuse operators, have collected at recycling centres/recycling parks, etc. It is nowhere near providing a complete picture of the volumes handled for reuse in the community.

the legal requirements[18]. However, increasing reuse is more than a matter of municipalities expanding their operations. Private individuals also have to reuse to a greater extent. Avfall Sverige has therefore published a handbook on safer reuse[19] and a guide on which construction materials and products are suitable for reuse[20]. These tools – and more – can be found in Avfall Sverige's digital toolbox for prevention.

READ MORE IN AVFALL SVERIGE'S REPORTS

- 2018:18 Sharing gadgets, space, vehicles and time – A guide to sharing economy in the municipalities
- 2018:29 Potential for increased reuse – case study recycling centres
- 2018:30 Measuring edible food waste – a pre-study
- 2019:08 Results and experiences from using Avfall Sverige's waste prevention method – "Top step" (Översta steget) and other projects
- 2019:32 Reuse of construction and demolition materials and products in municipalities
- 2020:21 Guide – Minimisation masters
- 2022:11 Increased reuse through innovation and circular resource flows
- 2022:12 Increasing the reuse of materials
- 2022:24 Measures to reduce food waste in households
- 2023:01 Climate impact of different waste fractions, updated 2022 (incl. calculation model)
- 2024:01 Increased reuse with the help of new recipients – guidance for municipalities

15 Avfall Sverige Report 2021:03 Guide for events without single-use products
16 Avfall Sverige Report 2023:13 Case study: Reducing the volume of paper advertising sent to the municipality
17 Avfall Sverige Report 2020:08 Good examples of municipal reuse work
18 Avfall Sverige Guide #9: Legal requirements for prevention and reuse
19 Guide to safer reuse (2023)
20 Construction reuse guide (2022)

Collection and transport

1,985,270 tonnes
188 kg per person

The per-person volume of food and residual waste collected decreased by 2 percent in 2023.
Home-composted food waste is not included.

426,280 tonnes of food waste were collected in 2023, which equates to 40 kg per person. In 2023, 276 of the country's 290 municipalities had separate collection of source-separated food waste. Just over 38,000 tonnes of food waste was home composted, amounting to 4 kg per person.

There are a number of different systems for collecting and transporting food and residual waste. The most common is by means of two separate bins. As of 2024, the separation of food waste is mandatory for households and businesses. This requirement is linked to the EU Waste Framework Directive. Municipalities have a responsibility to collect the separated food waste as a separate fraction.

In order to achieve higher levels of material recycling for packaging, the Government has decided that the collection of packaging shall take place closer to households. Accessibility shall be increased. Collection will gradually shift from collection at recycling centres to kerbside collection. This is expected to be fully implemented throughout the country by 2027. In 2024, responsibility for the collection of packaging was transferred from producers to municipalities to be more rationally linked to the collection of food and residual waste, but with responsibility for material recycling remaining with producers. Under the new ordinance, producers will bear the costs of collection and material recycling.

The transition to kerbside collection is well in line with the EU Waste Framework Directive, which requires packaging and food waste to be collected separately across the EU. Responsibility for collection and recycling of recyclable paper has been transferred to the municipalities since January 2022 through the lifting of producer responsibility.

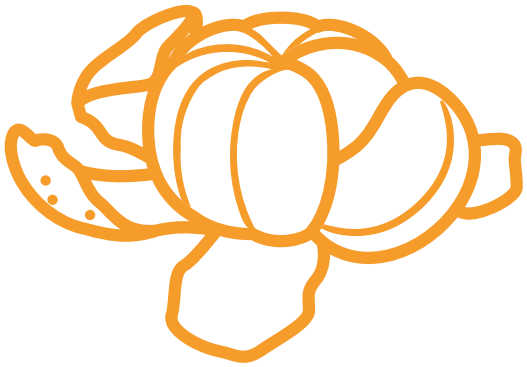
At present, over 60 percent of the apartment blocks have kerbside collection of packaging and recyclable paper, where the fractions are collected in separate bins or underground containers. There is also collection with different coloured bags for different fractions by means of optical sorting. Both for apartment blocks and single-family houses.

Statistics show that the total volume of collected packaging and recyclable paper per person is higher, and residual waste lower, in municipalities with kerbside collection[21].

VEHICLES AND FUEL

Rear-loading vehicles are the most predominant waste collection vehicles, but side-loading vehicles are also common. The proportion of multi-compartment vehicles is increasing as a growing number of municipalities' transition to kerbside collection in multi-compartment bins.

The choice of fuel can be controlled by the requirements the municipality sets during procurement. In recent years, there has been a clear shift from fossil diesel to various forms of biodiesel, such as HVO, which is a synthetic diesel made from e.g. slaughterhouse or grain waste.



The volume of food waste collected equates to 40 kg per person. 40 kg of food waste is equivalent to the weight of the peels from

1,700 clementines

21 Household waste in figures 2022 – county and municipal waste statistics

Hybrid electric vehicles and electric vehicles have great potential for the waste industry and are being used in various places. In addition to the environmental benefits, electric vehicles also significantly reduce noise levels during operation and emptying. Through procurement, municipalities can impose requirements on the adaptation of waste bins and vehicles for health and safety at work.

DEVELOPMENT OF THE COLLECTION SYSTEM

Waste collection previously meant heavy lifting and many work-related injuries, but today bags have been replaced by bins or other types of containers, providing a better working environment.

In many places, manual waste handling has been replaced by new technology and automated systems such as vacuum waste collection and underground container systems. Both of these systems are on the increase, particularly in the cities and in newly built areas. In addition to aesthetics and design, an advantage is that they do not require any heavy manual handling during emptying. Vacuum waste collection is a fully automated system which reduces the need for transports, particularly in residential areas. The vacuum waste collection system collects waste pneumatically in an automated vacuum system. This is then transported through underground tubes from the refuse chutes to collection points, where the waste is collected.

Underground containers are a fast-growing collection system throughout the country. Containers placed underground reduce the need for space at street level, where only the disposal hatch/chute is visible. The temperature underground is relatively low, which prevents bad odours. The containers are emptied using a vehicle with loader crane.

There are also underground containers that can be emptied using a front loader vehicle. Because underground containers hold larger volumes, the number of trips can be reduced.

RECYCLING CENTRES

At the municipal recycling centres, households can hand in bulky waste, garden waste, WEEE and hazardous waste. Bulky waste is municipal waste that is too heavy, too bulky or has other characteristics that make it unsuitable for collection in bins.

The recycling centres handle hazardous household waste, with the risks that this can involve when the waste is received, sorted and transported. In order to create a safe environment for visitors and staff continuous occupational health and safety work is undertaken on risk assessment, the correct protective gear and secure premises for handling the hazardous waste.

Many of the country's recycling centres are hit hard by thefts, burglaries and incidents where staff are threatened by visitors. Electronics, items turned in for reuse and car batteries are the main targets for theft. Many of the larger, newly-built recycling centres have therefore installed various technical security solutions, such as electric fences or surveillance cameras. Some have employed security firms who are on site during particularly vulnerable periods.

A growing number of municipalities are also introducing access control systems at recycling centres, where visitors need to present a driving licence or visitor card to enter. In addition to improving security, this measure also improves the customer flow and leads to better visit statistics. The access control system is often combined with a number of free visits, and is also a prerequisite for so-called unmanned recycling centres, where households can drop off their waste when no staff are on hand. To be approved for this, the visitors must first complete a short training programme in sorting and safety. Unmanned hours are increasing at Sweden's recycling centres, as it is a cost-effective way to increase collection and service to citizens.

1,622,620 tonnes

In 2023, households disposed of 1,622,620 tonnes of bulky waste, most of it at municipal recycling centres. This was a decrease of 6% compared to 2022.

597

There are 597 recycling centres throughout the country which combined receive about 26 million visits annually.

154 kg per person

The volume of bulky waste corresponds to 154 kg per person.

In addition to larger recycling centres, there are also smaller neighbourhood recycling centres in several places, which focus on collecting waste from households without cars and trailers. There are also mobile recycling centres, which are manned facilities that can travel around and are often made up of one or more trucks. These accept e.g. hazardous waste, some bulky waste and usually also WEEE and items for reuse.

A growing number of recycling centres are focusing on enabling municipal inhabitants to turn in items for reuse. Many recycling centres have therefore partnered with volunteer organisations that resell the items, or allow visitors to freely pick up and drop off items directly on site. Some recycling centres also have their own on-site reuse operations, often in cooperation with job training.

RECYCLING STATIONS

Until now, recycling stations organised by producers have been used for the collection of packaging. With the new ordinance, collection is being shifted to kerbside collection, which means that the need for recycling stations will decrease over time. Most recycling stations, or easily accessible collection points according to the ordinance, will be maintained in the near future, but will gradually shift to accepting bulky paper and plastic packaging once the kerbside system has been expanded. Packaging from businesses shall have dedicated collection points.

COLLECTION OF COOKING OIL AND GREASE

Since 1 January 2024, there is a requirement for biological waste to be collected separately. This includes edible fats, such as frying oil. As there is no requirement for kerbside collection, many municipalities choose to collect it at the recycling centre. However, the municipality may also allow, through its regulations, for smaller quantities to be disposed of in residual waste as a means of reducing operational problems and blockages in the sewerage system. Cooking oil can be recycled or reused. There are various recovery and treatment options for the source-separated and collected cooking oil. It can be used:

- as a raw material for the chemical industry
- in anaerobic digestion for biogas production
- in the production of biofuel.

READ MORE IN AVFALL SVERIGE'S REPORTS

- 2017:31 Manual for hand-picking analysis of household food and residual waste
- 2018:10 Access control systems at recycling centres
- 2018:11 Kerbside collection in an urban environment
- 2018:16 Waste planning handbook
- Avfall Sverige's handbook for hazardous waste from households
- 2018:32 Build a recycling centre! Updated manual for designing recycling centres
- 2018:37 Good examples of mobile recycling centres
- Avfall Sverige's handbook for waste facilities
- 2019:24 Waste collection. Procurement or self-management?
- 2020:10 Waste management in sparsely populated areas, on islands and during seasonal variations
- 2022:08 Experiences and good examples of introducing and operating unmanned recycling centres
- 2022:23 Unity – Is it possible to replace all current plastic variants with a smaller number?
- 2024:02 Permits and laws at the recycling centre

Most common collection systems for single-family houses

Two separate bins
(one for food waste and one for residual waste)
56%

Only one bin
5%

Multi-compartment bins
(Mainly 4-compartment)
27%

Different coloured bags for optical sorting
(usually food waste+residual waste, but there is also residual waste+food waste+ newspapers/packaging waste)
12%

Sludge and latrine waste

Collecting and treating latrine waste, sludge and other fractions from small, private sewers falls under municipal waste responsibility. Sludge from sludge separators and blackwater from closed tanks are often treated at municipal wastewater treatment plants together with other incoming sewage. However, Revaq-certified wastewater treatment plants[22] are finding it more and more difficult to take in sludge from sludge separators as it often has low nutrient content and a relatively high Cd/P ratio. Other options for sludge disposal are therefore needed[23]. The treatment charge for sludge from sludge separators averaged SEK 185 per tonne, excluding VAT, in 2023. 43 percent of the sludge from private sewers was used on agricultural land, and 21 percent was used to cap landfills. The trend is that sludge for landfill capping is decreasing, while use on agricultural land is increasing.

203 municipalities have reported that they handle 49,400 latrine waste collections per year, in total 1,100 tonnes of latrine waste. The scope varies from one latrine waste collection per year in certain municipalities to up to 8,000 collections in municipalities with many second homes. The number of latrine waste collections has decreased by 36 percent since 2012. Many municipalities have systematically worked to phase out latrine waste collection for reasons related to occupational health and safety.

Solutions for reducing phosphorous in individual plants, such as phosphorous traps[24] and micro treatment plants[25], have been installed in recent years. This is in response to requirements imposed on the reduction of emissions that cause eutrophication. The emptying and treatment of filter material from phosphorus traps and sludge from micro treatment plants is part of the municipal waste management responsibility. Only a small number of municipalities have replacement routines for phosphorous traps, and only 43 tonnes of phosphorus filter material was collected in 2023.

SLUDGE COLLECTION

87 percent of municipalities employ private contractors for the collection of sludge; 9 percent undertake this in-house and the remaining 4 percent use a combination. 60 percent of the 220 municipalities that provided information in Avfall Web run entirely on renewable fuels, such as HVO and biogas. One-fifth run partly on renewable energy.

Sludge collection can be done using different techniques, namely full drainage, partial drainage and mobile dewatering. With full drainage, the entire contents of the sludge separator are drained and transported away. With mobile dewatering, the content of the sludge separator is suctioned up and dewatered, either by mechanical separation or with the help of polymers. Partial drainage involves suctioning up the bottom sludge and floating sludge and leaving the water phase or returning it to the sludge separator. Partial drainage can be performed with a one-compartment or two-compartment vehicle. 72 percent of the municipalities use full drainage, 7 percent use mobile dewatering, 17 percent use partial drainage with two-compartment vehicle, and 4 percent use partial drainage with one-compartment vehicle. Partial drainage and mobile dewatering reduce transport to drop-off and the amount of sludge that needs to be treated, which is positive for both the environment and the economy.

Sludge collection is often hard and physically tiring, with several manual operations such as pulling hoses long distances and lifting heavy manhole covers and hard sludge cake. The municipalities are working actively to make long-term improvements to the working environment. Cooperation is required between the various actors to strategically and systematically work on occupational health and safety issues. Taking inventory of and documenting the municipality's collection points is an important component in improvement, and is crucial to a sound and transparent procurement process[26].

CERTIFICATION

Certification requirements for systems to ensure the quality of fractions from small sewers, SPCR 178, have been in force since 2012. The requirements were updated in 2019. The regulations regard source-separated sewer fractions such as WC wastewater, latrine waste and urine. Other source-separated organic raw materials can be approved if they do not negatively impact any part of the treatment and they have a positive effect on the end product. One example is food waste from kitchen food waste disposers. There is no limit in terms of how many may be connected to the sewer systems that the source-separated fractions come from. Sewer fractions like sludge from sludge separators and greywater cannot be certified. For the plant to be certified, the sewer fractions must meet basic criteria[27].

GREASE SEPARATORS AND COMBINATION SYSTEMS

Grease generated in households and restaurants is categorised as municipal waste[28]. Approximately 210,380 tonnes of sludge from 18,460 grease separators were treated by the municipalities in 2023. On average, each system is

22 Revaq certification applies to sludge from treatment plants; see svensktvatten.se
23 Avfall Sverige Report 2016:20 Dewatering of sludge from small wastewater treatment plants – quality and disposal
24 Avfall Sverige Guide #19 Phosphorous filters – handling and replacement
25 Avfall Sverige Report U 2013:14 Micro treatment plants in private sewers
26 Avfall Sverige Guide #13: Sustainable occupational health and safety during sludge collection from private sewers
27 Avfall Sverige Report 2018:19 Ammonia hygienisation of source-separated sewer fractions from Swedish households. Underlying data from updating SPCR 178 "Systems to ensure the quality of fractions from small sewers"
28 Avfall Sverige Guide #25 Meaning of the term municipal waste

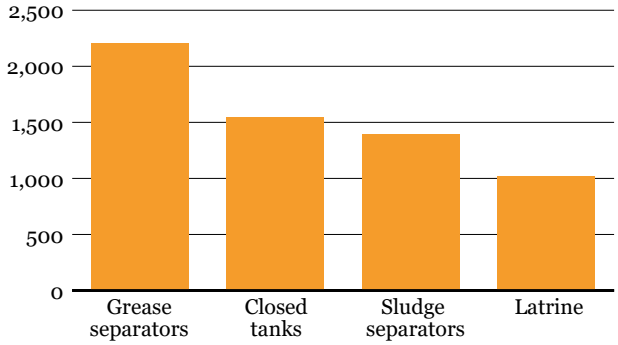
emptied 3.4 times per year, but there is great variation from once a year to twelve times a year in some municipalities. 83 percent of the grease separator sludge undergoes anaerobic digestion, primarily at municipal wastewater treatment plants. On average, the treatment charge amounted to SEK 442 per tonne, excluding VAT. Systems in which a kitchen food waste disposer with food waste separator is connected in series with a grease separator, referred to as combination systems, have recently been introduced in some municipalities[29].

READ MORE IN AVFALL SVERIGE'S REPORTS

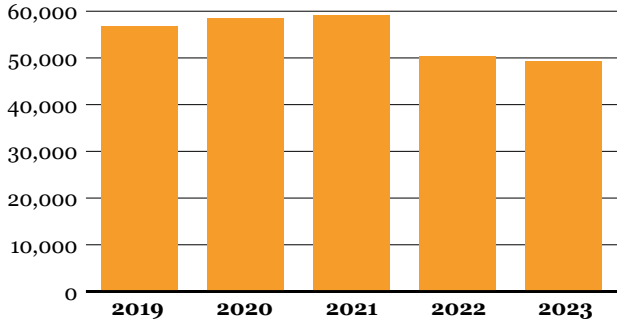
- 2016:07 Sustainable eco-cycle of small sewers
- 2019:02 Sludge collection with two-compartment vehicle. Smaller amount to transport and treat – better for the environment!
- 2020:16 A comparative study of two sludge collection techniques – full drainage and mobile dewatering with polymers
- 2022:16 Partial drainage of sludge separators with one-compartment vehicle
- 2023:14 Reduction of medicinal products through urea treatment of source-separated WC wastewater – a pre-study

Collection charges 2023

SEK per drainage, incl. VAT

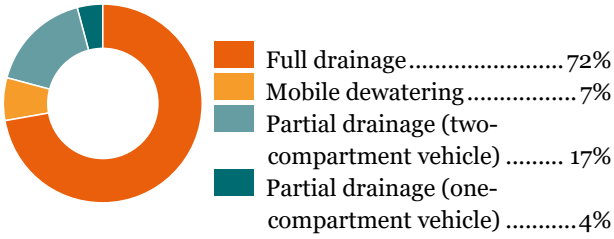


Number of latrine waste collections 2019–2023



Sludge collection service providers 2023

Sludge collection technique 2023

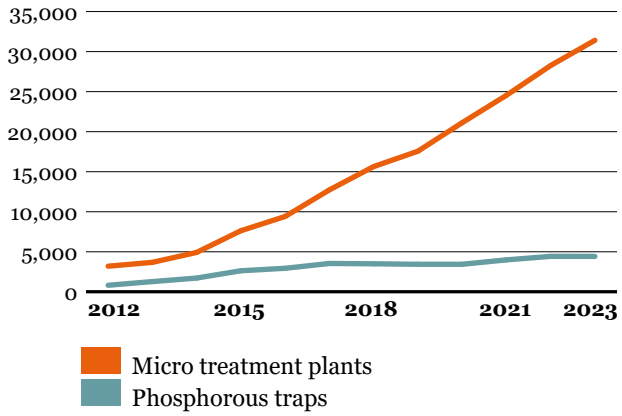


Disposal of sludge 2023

Number of individual wastewater treatment plants 2023

Total number of private sewers	**700,710**
Sludge separators, number of plants	549,050
Sludge separators, number of collections	532,120
Closed tanks, number of plants	92,940
Closed tanks, number of collections	175,600

Number of micro treatment plants and phosphorous traps 2012–2023



29 Avfall Sverige Report 2018:35 Grease separators and combination systems with separators for food waste and grease

Hazardous waste

77,450 tonnes of hazardous waste[30] were collected from households in 2023 (equivalent to more than 7.3 kg per inhabitant), an increase of 2 percent compared to 2022. This volume includes 52,260 tonnes of impregnated wood and 2,150 tonnes of asbestos, a decrease of 2 percent and 17 percent, respectively compared to 2022. Hazardous waste in the form of paint, chemicals and oil waste amounted to 23,040 tonnes.

To detoxify the eco-cycle, it is important that hazardous waste be separated and handed in properly and in the right place. Hazardous substances may be found in extremely small quantities in some products, but taken as a whole they can cause substantial harm if they end up in the wrong place.

The municipalities are responsible for the collection, transport and treatment of hazardous waste from households. This responsibility is regulated by the Swedish Environmental Code, the Swedish Waste Ordinance and the municipal waste regulations. Households and businesses, for their part, have an obligation to separate hazardous waste from other waste. Most municipalities have regulated this obligation in the municipal refuse collection regulations.

There are no exact details on the amount of hazardous waste produced by industry, but according to the latest official waste statistics reported to the EU by the Swedish Environmental Protection Agency, 3.3 million tonnes of hazardous waste were produced in Sweden in 2020[31]. The waste came mainly from construction, the service producers, energy supply, metal and metal products, and the manufacture of chemicals, pharmaceuticals, and plastic products. The Avfall Sverige report Where does hazardous waste go? from 2017 shows that about 343,000 tonnes were exported to European treatment plants.

COLLECTION SYSTEMS

The majority of hazardous waste from households is collected at municipal recycling centres, but four out of five municipalities also have some form of kerbside or consumer-oriented collection, for example through collection containers hung off of waste bins, collection bins outside of shops, or boxes in refuse rooms[32]. Many municipalities also combine several different collection forms to increase collection. This includes, for example, battery bins, mobile recycling centres, green vehicles, eco stations and in-store collection in cooperation with different retail chains.

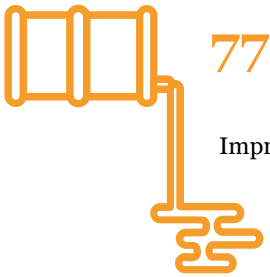
Pharmaceutical products fall under producer responsibility and must be turned in to a pharmacy. Many pharmacies also cooperate with municipalities for the safe collection of syringes and needles.

Hazardous waste dropped off at collection or waste treatment plants often requires pretreatment. As hazardous waste may contain substances which are to be phased out of the eco-cycle, treatment is often aimed at destroying these substances. Substances that cannot be rendered harmless or reused are taken to landfill. In such cases, it is important that the waste be chemically and physically stable so that hazardous substances do not leak out into the surrounding environment.

READ MORE IN AVFALL SVERIGE'S REPORTS

- 2024:09 Guide for classifying hazardous waste
- 2024:10 Critical care – handbook on the management of infectious waste, sharps, and chemotherapy and other pharmaceutical waste
- 2024:13 Pressure-treated timber – waste classification and management

Volume of hazardous waste collected

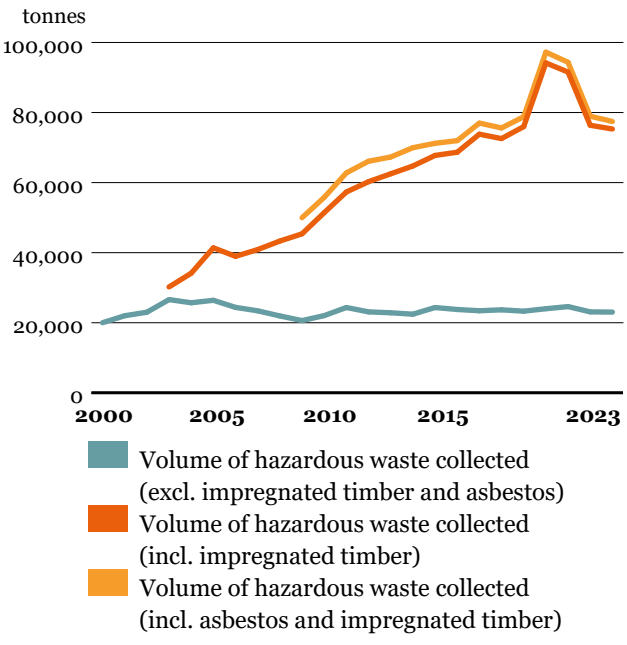


77,450 tonnes

7.3 kg per person

Impregnated wood: 52,260 tonnes
Asbestos: 2,150 tonnes
Paint, chemicals, etc.: 23,040 tonnes

Volume of hazardous waste collected 2000–2023



30 Hazardous waste is waste that Annex 4 of the Swedish Waste Ordinance describes with a waste code marked with an asterisk (*).
31 Swedish Environmental Protection Agency report Waste in Sweden 2020 Avfall i Sverige 2020 (Swedish Environmental Protection Agency report Waste in Sweden 2022 had not been published at the time of Swedish Waste Management 2023's publication)
32 Avfall Sverige Report 2022:02 Kerbside and consumer-oriented collection of hazardous waste from households

WEEE and batteries

COLLECTION SYSTEMS

Since producer responsibility for electrical and electronic products[33] was introduced in Sweden in 2001, municipalities and producers have cooperated on the collection of WEEE, waste from electrical and electronic equipment. Avfall Sverige, the Swedish Association of Local Authorities and Regions and the producer responsibility organisation El-Kretsen cooperate in the Elretur system, which means that the municipalities undertake to be responsible for the collection of WEEE from households in return for payment, and the producers are responsible for treatment. In Sweden, there are two producer responsibility organisations for WEEE, El-Kretsen and Recipo, the latter of which focuses more on retail collection.

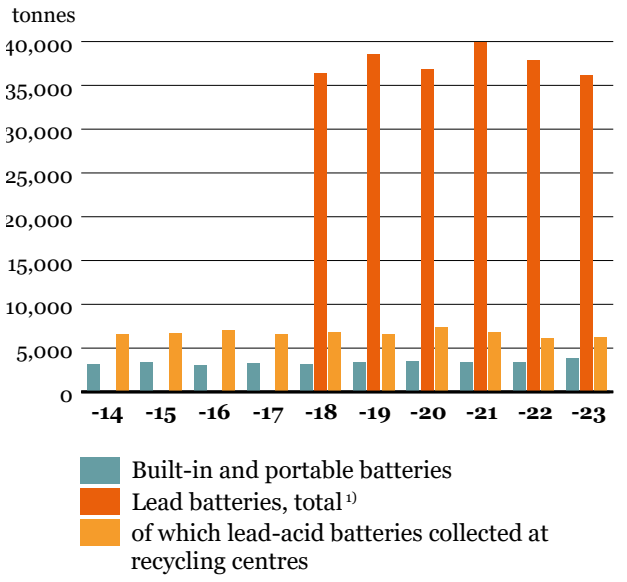
Avfall Sverige and El-Kretsen collaborate with several municipalities on different projects to develop these collection systems. The collection of WEEE from households takes place mainly at the municipal recycling centres, but a majority of the municipalities have several different collection systems for WEEE, both kerbside and consumer-oriented, such as battery bins[34].

Since 2015, shops are responsible for taking in WEEE. Large shops that sell electronics are required to collect all types of consumer electronics smaller than 25 cm, even if the consumer does not buy anything. For other shops, a one-for-one principle applies, i.e. if you buy a product, you have the option of turning in one equivalent old product at that shop. The collected products are submitted free of charge to an approved recycling collection system.

The battery producers are responsible for the collection, treatment and recycling of all batteries, regardless of when they appeared on the market.

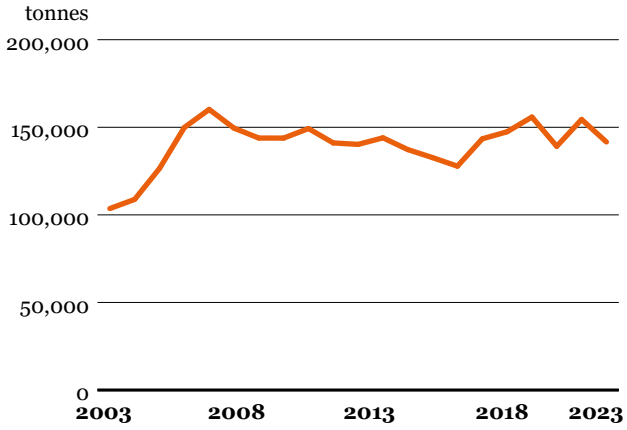
There are two approved national collection systems for WEEE – El-Kretsen and Recipo.

Volume of collected batteries 2014–2023



1) Source: BlybatteriRetur. Collection of lead batteries in Sweden refers to the volume of batteries collected for recycling in Sweden. Exports, which amount to about 4 tonnes per year, are not included.

WEEE collected for material recycling 2003–2023



Source: El-Kretsen and Recipo

33 See the definition of electrical and electronic waste in Ordinance (2014:1075) on Producer Responsibility for Electrical and Electronic Equipment
34 Avfall Sverige Report 2022:02 Kerbside and consumer-oriented collection of hazardous waste from households

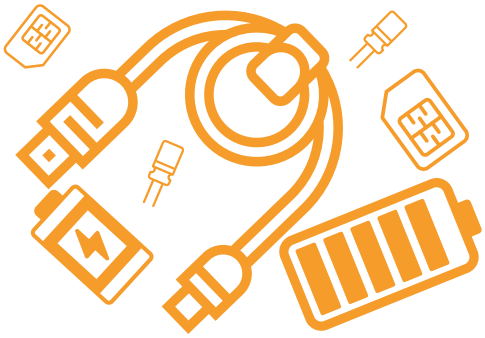
TREATMENT METHODS

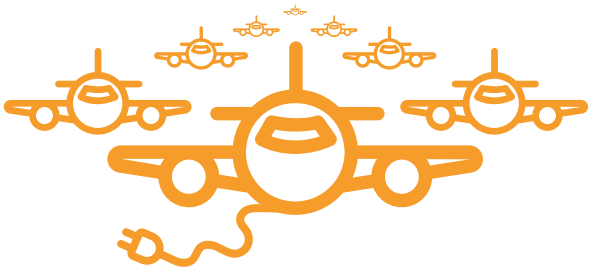
Electrical and electronic waste is pretreated through separation and dismantling. Pretreatment is carried out at certified facilities, after which the waste is sent for final treatment or recycling. Components containing hazardous substances are treated at approved treatment plants. Much can be recovered once the hazardous substances have been removed. Plastic cases are incinerated in energy recovery plants, and metals are sent to smelting plants for material recycling. Recovered copper, aluminium and iron are used as raw materials in new products. Computers, mobile phones and other IT products contain small amounts of precious metals that are also recovered. For example, some printed circuit boards contain gold and silver. Fluorescent tubes and CFL bulbs contain mercury and are therefore handled through separation in a closed process. Through the process, the mercury is disposed of in a safe and controlled way, while the fluorescent tube powder can be reused in the production of new light sources. The glass is cleaned and reused. Other types of light bulbs, such as incandescent bulbs and LED lights, are treated as part of the same process as fluorescent tubes and CFL bulbs. Batteries are sorted by chemical content before being sent for recovery or disposal.

86 kg invisible waste

#invisiblewaste

It's not always what you see that is the true heavyweight[35]





2,400 passenger planes

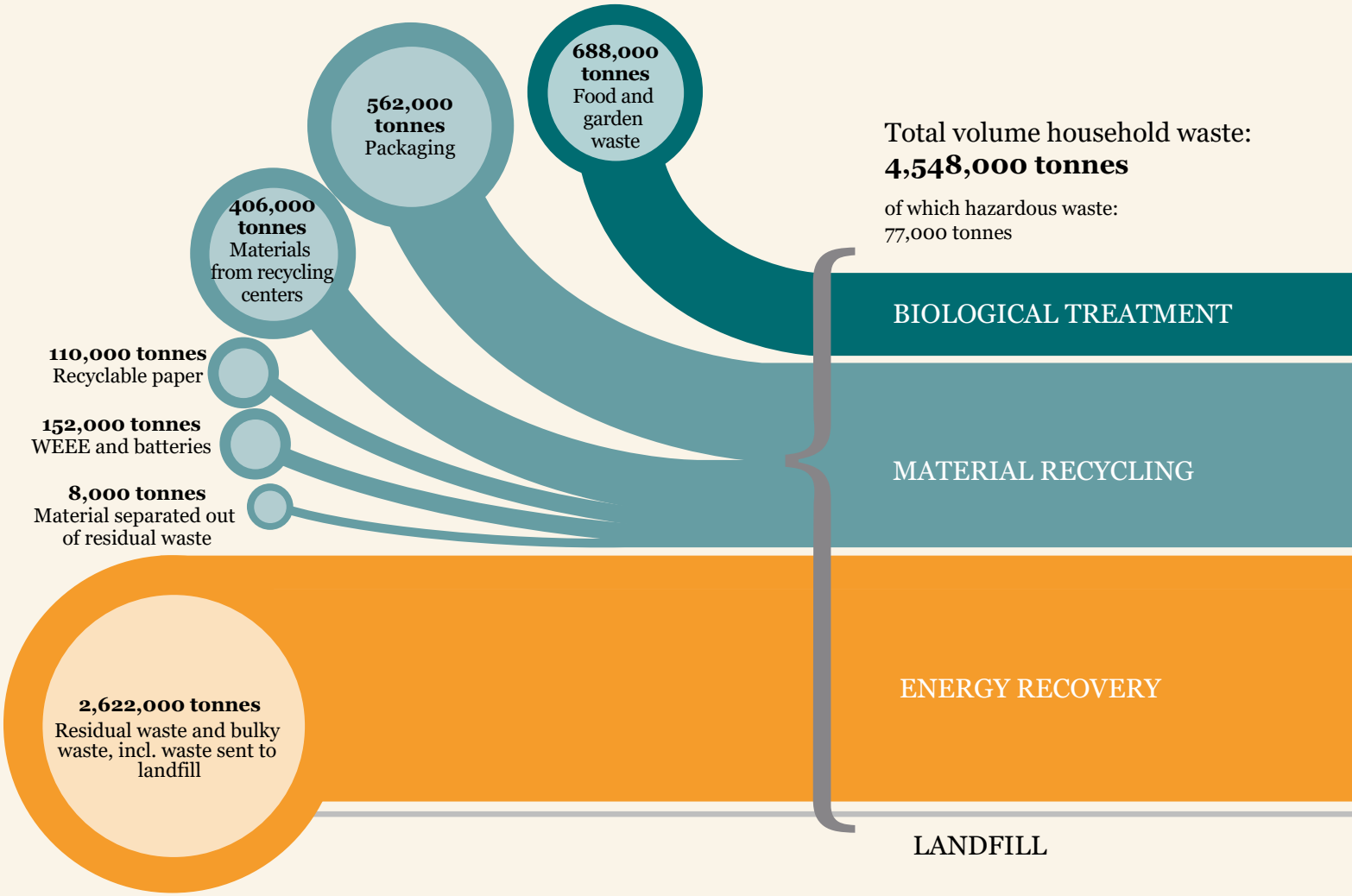
(141,640 tonnes) represent the weight of WEEE, excluding batteries, collected in 2023.

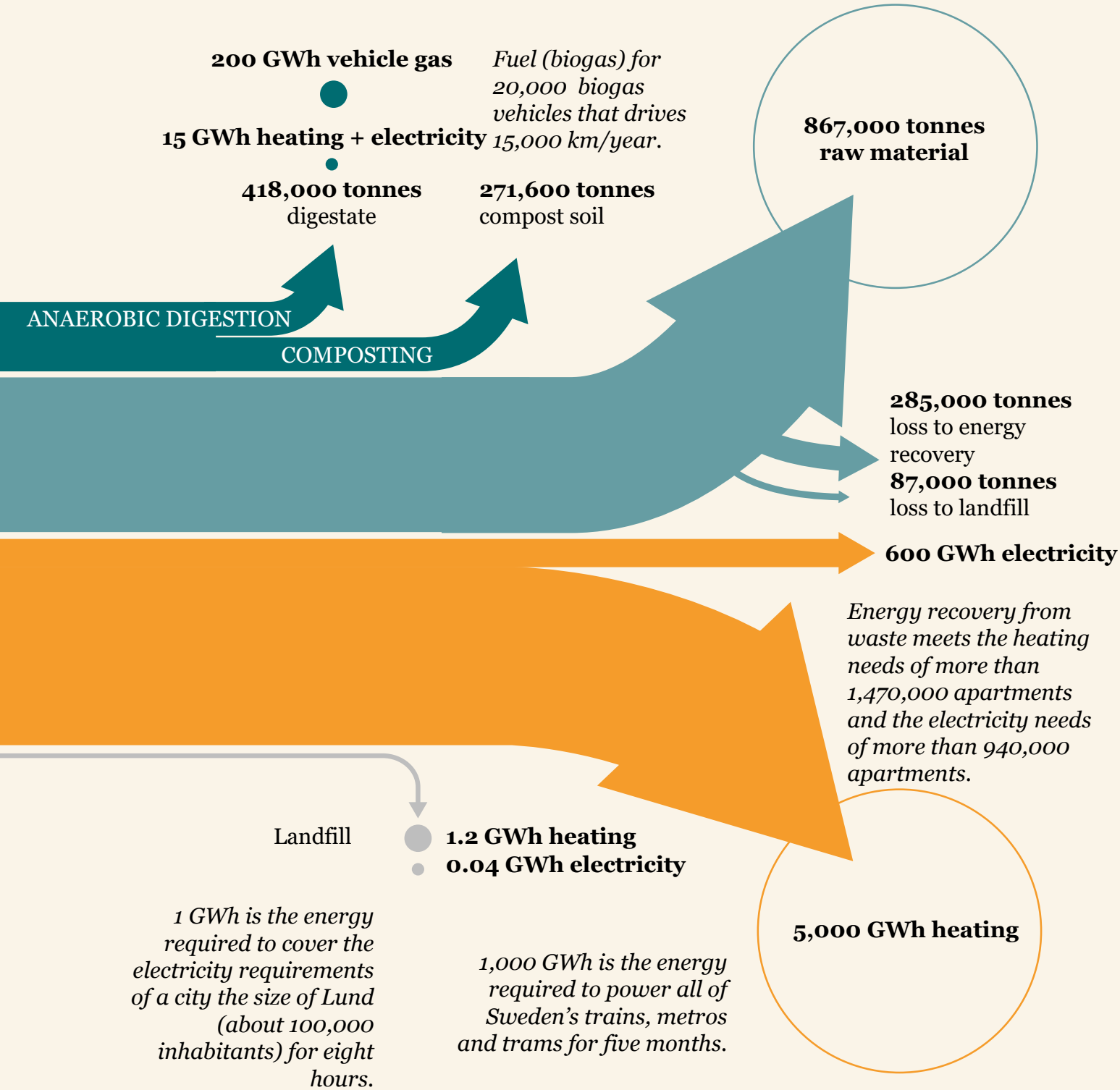
The volume of WEEE corresponds to

13.4 kg per person

35https://www.avfallsverige.se/fakta-statistik/forebyggande/osynligt-avfall/

Swedish household waste 2023




200 GWh vehicle gas
Fuel (biogas) for 20,000 biogas vehicles that drives 15,000 km/year.
15 GWh heating + electricity
418,000 tonnes digestate
271,600 tonnes compost soil
867,000 tonnes raw material
ANAEROBIC DIGESTION
COMPOSTING
285,000 tonnes loss to energy recovery
87,000 tonnes loss to landfill
600 GWh electricity
Energy recovery from waste meets the heating needs of more than 1,470,000 apartments and the electricity needs of more than 940,000 apartments.
Landfill
1.2 GWh heating
0.04 GWh electricity
5,000 GWh heating
1 GWh is the energy required to cover the electricity requirements of a city the size of Lund (about 100,000 inhabitants) for eight hours.
1,000 GWh is the energy required to power all of Sweden's trains, metros and trams for five months.

Material recycling

1,105,360 tonnes, 24 percent, of household waste went to material recycling in 2023. This corresponds to 105 kg per person, a three percent decrease compared to 2022. In addition, 138,790 tonnes of construction material were recycled.

Material recycling plays a key role in a sustainable society. It is therefore vital that waste be viewed as a resource, and handled correctly. Material recycling means that separated materials can replace other production materials or construction materials. This not only results in a reduction in the consumption of virgin material; it also leads to energy savings.

RECYCLING TARGETS

The EU wants to guide member states towards a more circular economy and has therefore intensified recycling targets in the new waste legislation. By 2025, at least 55 percent of municipal waste in the EU shall be recycled to new material. The target increases to 60 percent by 2030 and to 65 percent by 2035. The targets apply to material recycling, including preparation for reuse. In connection with this, reporting has been honed to apply to volumes actually recycled[36]. For packaging material, the target is material recycling of 65 percent by 2025, and 70 percent by 2030.

The Swedish Environmental Protection Agency conducts annual follow-ups of the recycling targets in Sweden. In 2022, 40 percent of municipal waste was actually recycled or prepared for reuse[37]. For packaging, only two of the nine national recycling targets were met in 2022[38]. The material recycling targets were met for metal packaging made of ferrous metal (steel) and aluminium[39]. There is no data for wood packaging, which means that total target fulfilment cannot be calculated. For recyclable paper, the material recycling target is 90 percent[40]. No follow-up of the target has been carried out.

NORDIC-WIDE SIGNAGE SYSTEM

In partnership with the Nordic waste organisations, Avfall Sverige launched a common system for waste terminology and symbols for waste in 2020. The system can be used in kerbside collection, at recycling stations and recycling centres, on bins, in refuse rooms, in collection in cities, and on packaging. A common system makes it easy to do the right thing – for citizens, municipalities and packaging producers – throughout the Nordic region.

COLLECTION SYSTEMS

In Sweden, producer responsibility for packaging has been in place since 1994. Most producers of packaging have organised their collection and recycling undertakings. This was previously done through FTI, but has now been taken

In total, there are about 100 different symbols for different waste sorting fractions

36 Read more about the EU Waste Directive https://eur-lex.europa.eu/legalcontent/SV/TXT/PDF/?uri=OJ:L:2018:150:FULL&from=EN
37 https://www.naturvardsverket.se/4b01c2/globalassets/data-och-statistik/avfall/kommunalt-avfall-statistikblad.pdf
38 Swedish Environmental Protection Agency report Sweden's recycling of packaging. Follow-up of producer responsibility for packaging 2022. https://www.naturvardsverket.se/4ae1a4/globalassets/data-och-statistik/avfall/sveriges-atervinning-av-forpackningar-2022.pdf
39 Cf Chapter 4, § 7 b of the Swedish Waste Ordinance (2020:614), as amended on 1 January 2022.
40 Avfall Sverige Report 2018:11 Kerbside collection in an urban environment

over by NPA, Näringslivets Producentansvar. A small number of producers are organised through the company TMR.

In June 2022, the Government decided that responsibility for collecting packaging waste will be shifted from the producers to the municipalities, and that kerbside collection will be the prevailing collection model in order to increase material recycling. All producers must be a member of a producer responsibility organisation approved by the Swedish Environmental Protection Agency. Both NPA and TMR are approved organisations.

As of 1 January 2022, producer responsibility for recyclable paper has been lifted, and the municipalities are now responsible for the collection and recycling of recyclable paper.

Household packaging has mainly been collected via FTI's unmanned recycling stations and via kerbside collection. Between 2024 and 2027, this will transition to being mainly kerbside. Collection may also be available at municipal recycling centres. Recyclable paper is collected in various ways by the municipality, mainly at recycling stations, but also via kerbside collection. Many municipalities have chosen to authorise contractors who have been directly contracted by owners of apartment blocks.

Many municipalities have already introduced kerbside collection of packaging and recyclable paper alongside food and residual waste, particularly for single-family houses, through collection in multi-compartment bins. A few municipalities collect the fractions in coloured bags, which are then sorted optically. In total, more than 75 municipalities offer kerbside collection from detached houses.

Households, and sometimes also small businesses, can hand in their bulky waste, WEEE and hazardous waste at municipal recycling centres. The amount of bulky waste at municipal recycling centres often varies with the state of the economy. Quantities tend to decrease in an economic downturn, and increase in an economic upturn.

RECYCLING

Packaging and recyclable paper are processed at different plants, both in Sweden and abroad, depending on the material. The recycling levels are high for paper and glass, while material recycling of plastics, for example, is lower.

In recent years, there has been an increase in the number of fractions at recycling centres as options for further material recycling are evolving, for example hard plastic and textile. Most bulky waste undergoes material recycling or energy recovery. A lot of hazardous waste is destroyed to detoxify the eco-cycle, but some is also sent to material recycling.

Materials that are generally difficult to recycle or that are made up of different composite materials go to energy recovery and are converted to electricity and heat. Examples of such materials are certain types of construction waste, sports equipment, some furniture and toys, and foam rubber, carpets, tarpaulins and cushions.

Waste prepared for reuse that is collected at recycling centres is increasing, as is construction material for reuse, which is collected separately. The material is often turned in to various partners, or are sold or donated directly at the recycling centre.

Material recycling of bulky waste is carried out, for example, for scrap metal that is sent directly to processing plants with which the municipalities have contracts. There, it is inspected, sorted based on type of metal, fragmented, and ultimately used to produce new products at steel and metal works.

Wood is usually sorted based on how it was treated, e.g. pure wood, painted, or pressure impregnated. Untreated wood is chipped and used as a biofuel or in the manufacture of chipboard. If the wood contains chemicals, e.g. it has been painted or pressure impregnated, it is treated separately and then destroyed to produce energy. A major initiative has been launched in the industry to reuse pallets, which are now sorted separately at many recycling centres.

Garden waste, such as leaves, grass clippings and fallen fruit, is processed through biological treatment. For example, it can undergo anaerobic digestion or be composted to soil that is sold at the recycling centre. Some garden waste is sent for energy recovery. Another garden waste treatment method that is being used in places such as Stockholm and Helsingborg is to use pyrolysis to generate biochar[41]. The method has attracted great national and international interest.

Stone, soil, brick and ceramics are turned into fill material that can be used in various forms of construction work. Corrugated board is a large fraction and is sent for recycling into new corrugated board. One paper fibre can be recycled 7-8 times.

41 Avfall Sverige Report 2018:14 The biochar market in Sweden

There are now also recycling methods for materials that were previously difficult to recycle, such as plaster and flat glass. Plasterboard is ground down into plaster powder, which is used to make new plasterboard. Flat glass is primarily recycled into insulation, but is also used to make new glass.

PLASTICS PROBLEMATIC WHEN IT COMES TO RECYCLING

Glass and metal are two materials that could theoretically be recycled an infinite number of times as long as they are not contaminated. Material recycling of plastics, on the other hand, is complicated since plastic waste is a mixture of a number of different types of plastics, and the products often consist of several composite materials and additives[42].

Plastic is a very useful material that combines many good properties. But plastic can also create problems, in their manufacture, use and recycling. Various environmental and health effects are examples of such problems, along with littering both on land and in our oceans. Plastic that cannot be reused or recycled because it contains hazardous substances, is improperly designed or contains multiple additives and dyes is a major issue, particularly in the waste stage. But, responsibility for addressing the problem begins right from the design and production stage.

Avfall Sverige has defined a number of positions[43] in relation to plastic for better management of the material, but also finds that the responsibility for achieving these targets lies primarily with the producers. A report shows that it is entirely possible to severely limit the number of plastic variants used today, which would increase recycling and the value of the plastic at the next stage[44]. The Government has also called attention to the various problems that plastic can cause, and launched an inquiry, called the Plastics Inquiry, to review possibilities for reducing the negative environmental effects of plastic. The inquiry[45] proposed measures to increase material recycling of plastic and investigate the need for alternative methods and techniques for reuse and material recycling, as well as to establish a national node for coordination. Avfall Sverige contributed data to the investigation.

The Swedish Environmental Protection Agency has been commissioned by the Government to run a coordination node – National Plastics Coordination – which is a collection point with up-to-date knowledge and information that businesses, municipalities, regions, researchers and authorities need in their work for sustainable plastic use.

It is important to increase the recycling of plastic, not least because it is mostly fossil. Many municipalities now provide for the collection of plastic that is not packaging, referred to as rigid plastic. According to Avfall Web, 13,360 tonnes of rigid plastic were collected for recycling in 2023, an increase of 30 percent compared to 2022.

Technological development for automated sorting and material recycling is increasing steadily, as is the quality of the secondary raw material. In parallel, it is important to increase the demand for recycled material, particularly among producers, manufacturers and designers of new products.

In 2019, Svensk Plaståtervinning opened a new, modern sorting plant for plastic packaging in Motala, which has made it possible to increase the sorting of plastics. The plant has been expanded to enable the sorting of additional plastics, making it the world's largest plastic sorting plant. In 2021, Sörab and Stockholm Exergi opened Sweden's first automated pre-treatment plant for recyclable material from residual waste. The method sorts out some of the material that incorrectly ended up in the bin so that it can be recycled. However, it is important to separate at the source for cleaner material flows. Pretreatment for energy recovery is a complementary measure that aims to, among other things, reduce the amount of plastic sent for incineration.

TEXTILE COLLECTION

Textile is another fraction that has received increased environmental focus and is increasingly collected separately, usually in partnership with non-profit organisations. Textiles are mainly collected for reuse and further processing for reuse via sorting facilities in Europe.

Under the EU Waste Framework Directive, Member States must, as a general rule, introduce separate collection for at least paper, metal, plastic and glass, and by 1 January 2025 for textiles. The requirements apply to both municipal waste and other waste. Note that this refers to waste other than packaging waste, which is subject to producer responsibility. In May 2023, the Government therefore proposed that both textile waste that constitutes municipal waste, which is the responsibility of the municipalities, and other textile waste should be sorted and collected separately. The Government proposes that municipalities should inform households and operators to ensure that textiles are reused whenever possible. It does not propose any requirements for kerbside collection of textile waste. The focus and demand for textile recycling is large globally, but only a limited proportion of textiles are capable

42 Report No. C245 IVL Material recycling of plastic waste from recycling centres
43 https://www.avfallsverige.se/om-oss/vad-vi-tycker/
44 Avfall Sverige Report 2022:23 Unity – Is it possible to replace all current plastic variants with a smaller number?
45 SOU 2018:84 It's possible if we want it bad enough. Suggestions for sustainable plastic use.

of material recycling at present. However, many new initiatives for material recycling of textile are under way, both in Sweden and in the EU. Several stakeholders, such as researchers, research institutes, universities, industrial networks, municipalities and recyclers, are collaborating in various initiatives and methods with promising results. For example, Sysav has built the world's first fully automated textile sorting plant, Siptex, in Malmö.

READ MORE IN AVFALL SVERIGE'S REPORTS

- 2017:13 Sorting experiments with Swedish residual waste in ROAF's sorting plant
- 2019:03 Introduction to sales of waste – prerequisites and considerations for different types of materials

Volumes of packaging and recyclable paper collected from households and submitted for material recycling 2023

	tonnes	kg/person
Recyclable paper	110,530	10.5
Paper packaging	208,980	19.8
Metal packaging	21,130	2.0
Plastic packaging	97,530	9.2
Glass packaging	234,290	22.2
Total packaging	**561,930**	**53.2**

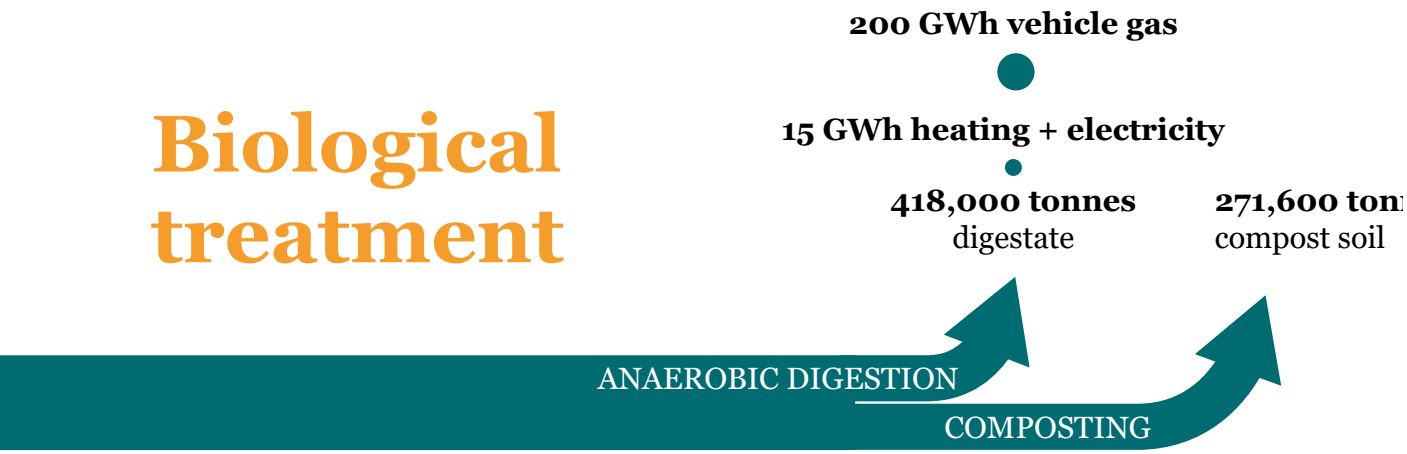
Source: Avfall Web and Förpackningsinsamlingen (FTI)
The information relates only to waste collected from households through recycling stations and by kerbside collection.

Collected household waste[1)] for material recycling 2019–2023, tonnes

	2019	2020	2021	2022	2023
Recyclable paper	189,380	168,400	148,950	127,420	110,530
Packaging made from cardboard, metal, plastic and glass[2)]	511,070	560,730	596,370	567,790	561,930
WEEE including cooling units	147,430	155,840	139,130	154,450	141,640
Portable batteries (incl. built-in)	3,380	3,460	3,550	3,410	3,870
Lead batteries [3)]	6,620	7,310	6,810	6,160	6,210
Oil waste	950	1,000	1,000	950	950
Water and solution-based paint	3,710	3,770	3,820	3,580	3,530
Other hazardous waste for material recycling	1,030	1,260	1,400	1,170	1,210
Scrap metal	160,790	176,550	158,930	139,370	135,440
Plaster waste	24,960	27,330	28,830	27,960	27,270
Flat glass	2,920	2,900	4,040	4,760	4,890
Rigid plastic	12,200	14,540	14,590	10,340	13,360
Corrugated board from recycling centres	53,470	56,340	57,570	52,190	49,040
Textile waste	5,340	3,490	3,300	4,870	5,780
Other material submitted for recycling, incl. tyres	41,900	44,160	29,820	31,800	29,780
Deep fryer oil	0	230	670	690	1,700
Residual waste from pretreatment to energy recovery					8,230
Total material recycling	**1,165,150**	**1,227,310**	**1,198,780**	**1,136,910**	**1,105,360**
Construction materials	146,790	172,990	162,310	160,430	122,950
Material recycling, incl. construction material	1,311,940	1,400,300	1,361,090	1,297,340	1,228,310

Source: Avfall Web, El-Kretsen Recipo, and Förpackningsinsamlingen (FTI)
1) The table includes some quantities that are not defined as municipal waste, but are part of the municipal responsibility, e.g. plaster, flat glass and construction materials from households.
2) In previous publications, packaging from businesses was included. This compilation only includes packaging from households (kerbside and recycling stations).
3) This figure refers to lead batteries (previously called car batteries) collected from recycling centres and not total quantities.

Biological treatment



The biological treatment of food waste[46] at Swedish anaerobic digestion and composting plants amounted to 469,400 tonnes in 2023. This is an increase of two percent compared to 2022.

In total, co-digestion plants processed 1.8 million tonnes of waste, including food waste from households and businesses, other biological waste from slaughterhouses and the food industry, and livestock manure. Total energy production was 1,160 GWh, of which 90 percent was vehicle gas.

The amount of food waste treated in co-digestion plants decreased by 4 percent, while food waste treated in central composting plants fell by 18 percent. Food waste digested at wastewater treatment plants increased by 53 percent compared to 2022.

According to the Swedish Environmental Protection Agency's calculations[47], 587,000 tonnes of food waste were generated in 2022, which equates to 56 kg per person[48] in Swedish households. It is estimated that 27 percent is edible food waste, i.e. unnecessary food waste, while 73 percent is unavoidable, such as peelings and other inedible parts. Some of the food waste generated is sorted out for separate collection and some is discarded with residual waste. In addition to household food waste, 107,000 tonnes are generated by restaurants and hotels, 37,000 tonnes from public meals (catering, etc.) and 89,000 tonnes from grocery stores. This adds up to 79 kg per person, or 820,000 tonnes. Food waste that is poured down the drain is excluded.

The Swedish Environmental Protection Agency's follow-up shows that in 2021, 42 percent of food waste was recycled through biological treatment to recover plant nutrients and energy. This means that Sweden is far from reaching the target, which states that by 2023 at least 75 percent of food waste from households, catering kitchens, shops and restaurants will be sorted and treated biologically so that plant nutrients and biogas are recovered. The Government has not adopted a new milestone target for the treatment of food waste.

However, a target for food waste is currently being negotiated at the EU level as part of the revision of the Waste Framework Directive.

THE COLLECTION OF SOURCE-SEPARATED FOOD WASTE

In 2023, municipal collection of source-separated food waste decreased by 0.5 percent compared to 2022, amounting to 426,280 tonnes. 95 percent of the municipalities, i.e. 276, collect source-separated food waste to varying degrees. The larger volume of food waste to the treatment plants can be attributed to factors such as added process water and the fact that they receive food waste from, for example, grocery stores, which the municipalities do not collect from.

Avfall Sverige has compiled a guide to help municipalities and businesses get started with the collection of source-separated food waste[49].

Avfall Sverige has also created an overview of various collection systems for source-separated household food waste[50]. The report describes what happens throughout the chain and uses this to assess how it affects the quality of collected food waste and ultimately the digestate/compost.
To achieve good quality, active quality assurance is required in the collection phase[51]. The quality of the end product is dependent on how well the food waste is separated at the source. An important tool for good quality is varying types of communication initiatives[52,53].

46 "Food waste" is used as a collective term for food and kitchen waste.
47 Swedish Environmental Protection Agency's website https://www.naturvardsverket.se/49501f/globalassets/media/publikationer-pdf/8900/978-91-620-8908-5.pdf
48 This includes 74 kg (777,000 tonnes) of food waste that is poured down the drain.
49 Guide #2 Introduction of system for the collection of source-separated food waste; updated August 2020.
50 Avfall Sverige Report 2015:15 Food waste's journey from table to earth
51 Avfall Sverige Report 2015:17 Quality assurance of source-separated food waste
52 Avfall Sverige Report 2016:03 Collection of food waste in apartment blocks. Good examples from municipalities and public housing companies
53 Avfall Sverige has compiled good examples of communication regarding the collection of food waste in a database available to Avfall Sverige members at avfallsverige.se

COLLECTION SYSTEMS

The most common collection system for source-separated food waste from single-family houses is a separate bin. 60 percent of the municipalities use this system. There are also four-compartment systems in which different fractions are sorted into separate inserts in two large bins, and collection systems using the optical sorting of different coloured bags that are put into the same bin. Of the municipalities that collect food waste, 22 percent use four-compartment bins and 12 percent use optical sorting. Some municipalities also have a two-compartment bin for food and residual waste.

TREATMENT METHODS

The main purpose of biological treatment is the circulation of nutrients in society as a means of closing the eco-cycle. Anaerobic digestion is the most common method of treating food waste in Sweden. Anaerobic digestion produces biogas, which consists mainly of methane and carbon dioxide. Biogas is a renewable source of energy. After upgrading, during which the carbon dioxide and other unwanted gases are removed, biogas can be used as a vehicle fuel or to replace fossil gas in industry. It can also be used for heating or electricity generation. Anaerobic digestion also produces digestate, a fertiliser with a high nutrient content. More than 1.8 million tonnes of digestate were produced in 2023. 99.8 percent of this organic fertiliser was used in agricultural land. Using digestate instead of mineral fertiliser puts plant nutrients back into the eco-cycle and reduces the need for e.g. imported phosphorus. Digestate is an important fertiliser for increasing organic farming in Sweden, which is a goal of the National Food Strategy for Sweden. In 2023, 28 percent of the digestate produced was approved for use in organic production.

CERTIFIED RECYCLING

Plants that produce compost or digestate from source-separated waste from the foodstuff and/or feedstuff chains can quality label their products through our certified recycling system. This is a certification system developed by Avfall Sverige in consultation with the agricultural and food industries, compost and digestate producers, soil producers, public authorities and researchers. LRF (Federation of Swedish Farmers), Svenska Kvarnföreningen (Swedish Flour Milling Industry Organisation), Lantmännen, Svenska Foder and KRAV are some of the organisations that approve digestates based on source-separated food waste that meets the certification requirements of SPCR 33.

Certification places demands on the entire handling chain, from incoming waste and substrate to the end product. There are also requirements related to the implementation of the process. From 1 January 2023, only approved food waste collection bags may be used for the production of certified digestate. An approved collection bag is certified according to EN13432 or evaluated for contact with foodstuff according to (EC) No 1935/2004. Setting requirements for the collection bags minimises the risk of unwanted chemicals or heavy metals migrating from the bag into the food waste during transport and storage, or in the digester. The new requirement is an easy-to-understand quality measure that aims to maintain and strengthen the high level of confidence in certified digestate by farmers and food companies.

In 2023, almost 1.7 million tonnes of certified digestate were produced for use as agricultural fertiliser. Today, 92 percent of all digestate produced in co-digestion plants is certified.

MINIMISING METHANE EMISSIONS

Avfall Sverige and Svenskt Vatten are collaborating on a self-inspection system[54] as a means of minimising methane emissions from biogas and upgrading plants. Methane emissions should be minimised for environmental, economic, safety and other reasons. A number of plants, both co-digestion plants and wastewater treatment plants, have joined the system. These plants systematically measure emissions and actively strive to reduce them. Every three years, measurements from the plants participating in EgMet are compiled in a summary report[55] that is published on Avfall Sverige's website.

The methane issue is a highly prioritised issue, and Avfall Sverige has developed a strategy for reducing methane emissions in the waste sector. An action plan with measures for biogas plants, etc. will be developed based on this strategy. A report summarising the methane emissions work to date was also published in 2024 (see Report 2024:14).

54 Self-inspection of Methane Emissions – A description of the system for inventorying and reducing methane emissions from co-digestion plants, wastewater treatment plants and biogas upgrading plants
55 https://www.avfallsverige.se/media/0oxfpggm/bu120-statistikrapport-metan_omga-ng-5.pdf

Biological treatment of food waste at central plants 2019–2023 (tonnes)

	2019	2020	2021	2022	2023
Food waste to co-digestion plants	332,380	401,490	407,090	406,090	390,870
Food waste to central composting plants	9,580	8,530	8,370	6,970	8,240
Food waste that undergoes anaerobic digestion at wastewater treatment plants	46,600	39,070	29,950	46,040	70,290
Total central plants	**388,560**	**449,090**	**445,410**	**459,100**	**469,400**

Food waste includes waste from households and household-like waste from restaurants, grocery stores, schools and similar organisations. Waste from the food industry, slaughterhouses, etc. is not included.
Food waste undergoing anaerobic digestion at sewage works includes food waste that travels to the sewerage system via a food waste disposer.

Biological treatment through anaerobic digestion, total* 2019–2023

	2019	2020	2021	2022	2023
Volume of waste to anaerobic digestion (tonnes)	1,710,100	1,763,010	1,733,520	1,789,800	1,808,590
Resource economisation (tonnes)					
Digestate	1,678,740	1,823,620	1,737,160	1,818,480	1,818,490
Energy production (MWh)					
Vehicle gas	886,840	963,270	1,053,200	1,040,770	1,045,240
Electricity	5,380	5,700	2,110	3,400	5,900
Heating	43,340	48,120	58,160	49,940	50,810
Flaring	57,230	68,390	44,730	38,720	38,430
Other	20,330	21,810	16,370	12,510	19,340
Total (MWh)	**1,013,120**	**1,107,290**	**1,174,570**	**1,145,340**	**1,159,720**

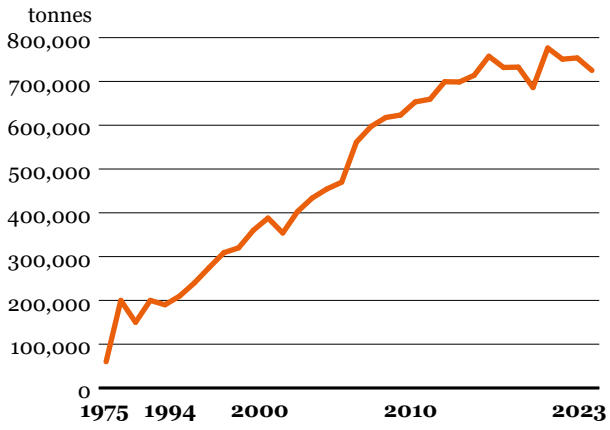
Source: Avfall Web, Avfall Sverige.
*) These volumes relate to the co-digestion plants that reported data to Avfall Web. This summary does not provide a complete picture of biological treatment through anaerobic digestion in Sweden.

Plants that compost food waste 2023

Municipality	Food waste (tonnes)
Alingsås	1,600
Luleå	3,460
Östersund	3,180
Total	**8,240**

Avfall Sverige operates the website biogodsel.se. The website contains information on what digestate is, how it is used, what effect it has, and what regulations govern its use.

Biological treatment of household waste 1975–2023



Co-digestion plants 2023

Municipality	Total (tonnes)	of which food waste
Alvesta	65,010	3,090
Bjuv*	46,980	13,970
Borås*	24,700	17,800
Falkenberg*	85,720	34,620
Falköping	7,630	4,810
Gotland*	95,000	6,000
Gävle*	26,770	17,480
Helsingborg*	109,810	17,300
Huddinge*	77,710	45,470
Härnösand*	6,120	6,120
Höör		0
Jönköping*	27,510	24,980
Kalmar*	20,690	510
Kalmar*	85,440	3,730
Karlshamn	6,970	5,870
Karlskoga*	50,650	19,050
Katrineholm*	64,500	0
Kristianstad*	94,440	20,980
Laholm*	35,060	4,820
Lidköping*	98,710	0
Linköping*	101,500	40,300
Mariestad	93,200	0
Skellefteå	9,980	8,370
Skövde*	60,710	2,220
Sotenäs*	21,000	11,920
Sävsjö*	75,890	70
Trelleborg*	77,060	0
Upplands-Bro*	55,060	34,770
Uppsala*	46,720	28,260
Vårgårda*	76,400	390
Västerås*	26,700	17,230
Västerås*	83,800	740
Örebro*	51,150	0
Total	**1,808,590**	**390,870**

Source: Avfall Web, Avfall Sverige.
Avfall Sverige's statistics include digestion plants classified as co-digestion plants, i.e. plants that treat several types of biological waste. Most co-digestion plants receive municipal waste (food waste). More information about the plants is available on Avfall Sverige's website.
*) Plant that producers certified digestate in accordance with SPCR 120

READ MORE IN AVFALL SVERIGE'S REPORTS

- Guide #15: Food waste collection under animal by-products legislation
- 2018:31 The food waste recycling processes of the future
- 2018:33 Knowledge synthesis on polymer in the biogas industry
- 2019:05 Fruit bag = paper bag for food waste
- 2019:09 Measuring greenhouse emissions using both conventional and new, innovative technology at digestate storage facilities
- 2019:11 Thermophilic or mesophilic digestion of food waste – which is better?
- 2019:17 The microbiological working environment for biological treatment
- 2020:17 Method for evaluating food waste pretreatment equipment
- 2020:20 Food waste pretreatment – summary of studies of twelve plants
- 2020:24 Exposure risks in the collection of food waste
- 2020:31 Recommendations for the measurement of microorganisms in the working environment of pretreatment and co-digestion plants
- 2021:20 Analysis parameters for digestate and compost – mapping and knowledge gathering
- 2022:04 Evaluation and reduction of methane emissions from different European biogas plant concepts (EvEmBi)
- 2022:09 Microorganisms in the working environment of pretreatment and co-digestion plants – mapping and measures
- Certified recycling, SPCR 120 – Annual report
- 2022:17 Investigation of possible changes to the unit for limit values in certified recycling – SPCR 120
- 2022:20 Evaluation of the certification systems for digestate and compost, SPCR 120 and SPCR 152
- 2022:24 Measures to reduce food waste in households
- 2023:29 Investigation of PFAS in digestate from Swedish biogas plants
- 2023:27 Reduced methane losses during maintenance of farm biogas plants
- 2023:19 Don't make it harder
- 2023:16 Impact of digestate on soil carbon
- 2023:11 Better sorted packaging and food waste in apartment blocks
- 2023:04 Bio-CCS credits: Revenue streams for carbon dioxide removal
- 2023:01 Climate impact of different waste fractions, updated 2022
- 2024:14 Knowledge synthesis on methane emissions in the waste sector

Energy recovery

In 2023, Swedish waste incineration plants received 6.6 million tonnes of waste for energy recovery. This is a decrease of 2.5 percent compared to 2022. 30 percent is household waste and 70 percent is other waste from businesses and other industries.

Waste is a fuel used in Swedish district heating systems. Energy recovery from waste meets the heating needs of more than 1,470,000 apartments and the electricity needs of more than 940,000 apartments. In 2023, 19.5 TWh of energy was recovered, of which 17.3 TWh was used for heating and 2.2 TWh for electricity. In addition, five plants reported that they delivered 0.09 TWh of district cooling. Sweden is among the countries in Europe that recovers the most energy per tonne of waste, approximately 2.9 MWh per tonne.

The capacity for energy recovery in Sweden is greater than the domestic availability of combustible waste. In 2023, Swedish energy recovery plants therefore also treated 2.2 million tonnes of sorted waste from other European countries, 716,540 tonnes of which was municipal waste. This waste contributes to the fuel supply in Sweden and solves some waste management problems in exporting countries. In the EU, a total of 125 million tonnes of waste is still sent to landfill (2020)[56], 53 million tonnes of which is municipal waste (2022)[57]. This leads to methane emissions equivalent to more than 130 million tonnes of carbon dioxide[58]. To reduce the environmental impact of landfills, the EU has set a target of maximum ten percent of all municipal waste being sent to landfill by 2035. This transition to a more circular economy means that millions of tonnes of waste must be treated in other ways, including through energy recovery.

Waste sent to energy recovery often contains some fossil plastic waste. This can include materials that are unsuitable for material recycling or mis-sorted packaging that has ended up in the residual waste stream. When such waste is incinerated, fossil carbon dioxide is emitted. Avfall Sverige's ambition is to halve fossil emissions from energy recovery by 2030 and reduce them to almost zero by 2045. The analysis has been summarised in an action study[59] followed by an updated report in 2024[60].

There are 35 incineration plants with energy recovery of household waste in Sweden. Kils energi, Högbytorp and Söderenergi do not accept household waste, but are members of Avfall Sverige and are included in the energy recovery statistics. Two plants that accept household waste have not reported data for 2023.

56 https://ec.europa.eu/eurostat/statistics-explained/index.php/Waste_management_indicators
57 https://ec.europa.eu/eurostat/statistics-explained/index.php/Municipal_waste_statistics#Municipal_waste_treatment
58 https://www.eea.europa.eu//publications/annual-european-union-greenhouse-gas-1
59 Avfall Sverige Report 2021:09 Backcasting – how Sweden can achieve fossil-free energy recovery from waste incineration
60 Avfall Sverige Report 2024:04 Backcasting – how Sweden can achieve fossil-free energy recovery from waste incineration (Updated)

There is residue from combustion. Slag makes up about 14 percent by weight of the amount of input waste, and flue gas treatment residues make up 4 percent by weight. Slag consists of materials that are not combustible or do not evaporate during combustion. Examples of such materials are glass, porcelain, iron scrap and gravel.

Once larger objects and metal residues have been sorted out for material recycling and the remaining material has been sifted and stabilised, what remains is granulated slag. This is mainly used as a construction material in landfill sites, but it would be beneficial to be able to use it instead of sand and natural gravel in road construction, for example[61]. Sand and gravel from natural deposits are a finite resource that should be reserved for particularly pressing areas of application. Avfall Sverige actively works actively with its members to ensure that granulated slag used outside of the plants will not cause harm to people or the environment.

Flue gas treatment residues is the collective term for a fine-grain fraction that is created during treatment of flue gas. The fraction consists of fly ash, filter cake from hose filters, and sludge from wet flue gas treatment. After they are stabilised, flue gas treatment residues are either transported to landfill or used as a neutralisation agent when refilling mines and pits. In addition, a growing number of methods are being developed to recycle resources such as metals and salts from fly ash.

RECYCLING METHOD

According to the EU Framework Directive on Waste and the Swedish Waste Ordinance, waste incineration with efficient energy recovery is considered a recycling method[62]. Swedish plants fulfil the Energy Efficiency Criterion (R1)54[63] by good margin. Energy recovery is a hygienic and environmentally sound method for treating and detoxifying waste that cannot or should not be treated using any other method, such as infectious hazardous waste from the healthcare sector. Energy recovery is one of only a few treatment methods for this waste. This is particularly true in times of pandemic, when large volumes are generated in a short period of time and the hospitals' own treatment capacity is not sufficient.

READ MORE IN AVFALL SVERIGE'S REPORTS

- 2017:06 Industry-wide agreement for quality assurance of waste fuel
- 2017:23 Right item to the right treatment. Material recycling, waste incineration and the detoxification of society
- 2017:24 Dioxin and waste incineration
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- 2019:27 Fuel quality – current status and scenarios for composition of residual waste by 2025
- 2021:18 PFAS in waste residuals from Swedish incineration plants
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- 2023:02 Pre-study on reducing plastic waste sent to energy recovery
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- 2023:04 Granulated slag and dust spreading from construction work
- 2023:04 Commercial fly ash treatment methods
- 2023:24 Dioxin sampling at start/stop conditions over flue gas treatment with carbon-impregnated filling bodies
- 2023:03 In-depth analysis of plastics in household residual waste and its potential for increased material recycling and reduced climate impact
- 2024:04 Backcasting – How can Sweden achieve fossil-free energy recovery from waste incineration?

61 Avfall Sverige Report 2019:14 Updated decision-making support for recycling granulated slag in specific asphalt-covered construction structures
62 EU Framework Directive on Waste (2008/98/EC) and the Swedish Waste Ordinance (2020:614)
63 Read more about the Energy Efficiency Criterion (R1) in appendix 2 of the Swedish Waste Ordinance (2011:927)

Energy recovery plants 2023

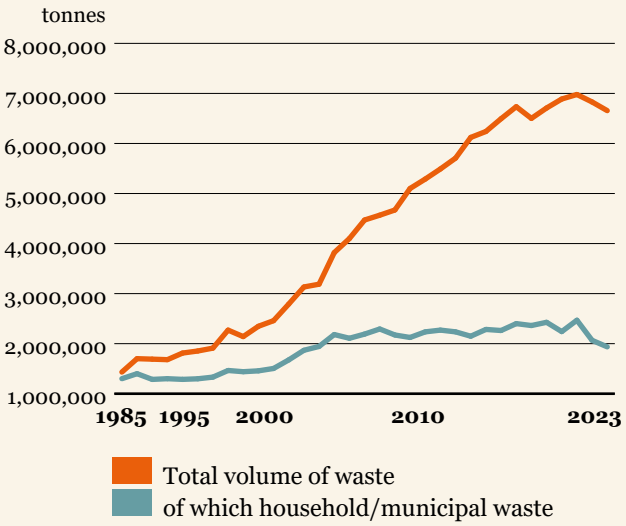
		Processed waste (tonnes)		Energy production (MWh)	
Municipality	**Plant**	**Total**	**of which household waste from Sweden**	**Heating**	**Electricity**
Avesta	Källhagsverket	52,060	11,960	154,720	0
Boden	Bodens Värmeverk	137,670	94,740	308,560	49,930
Bollnäs	Säverstaverket	73,000	43,230	162,420	34,580
Borlänge	Fjärrvärmeverket, Bäckelund	78,560	39,880	224,300	29,830
Borås	Ryaverket	105,770	18,630	235,020	43,600
Eda	Åmotsfors Energi	68,570	13,670	165,670	12,400
Eksjö	Eksjö Energi AB	42,680	19,240	125,710	12,080
Finspång	FTV Värmeverket	24,720	1,770	64,400	0
Gothenburg	Sävenäs avfallskraftvärmeverk	485,510	190,700	1,378,310	168,340
Halmstad	Kristineheds avfallsvärmeverk	168,200	56,990	446,390	46,370
Helsingborg	Filbornaverket	215,000	65,000	482,880	115,770
Hässleholm	Beleverket i Hässleholm	46,070	21,700	114,790	4,100
Jönköping	Kraftvärmeverket Torsvik	144,980	25,730	430,370	62,480
Karlskoga	Karlskoga Kraftvärmeverk	92,730	32,870	180,270	20,300
Karlstad	Avfallsvärmeverket på Heden	41,350	30,390	127,890	0
Kil	Kils Avfallsförbränningsanläggning	16,640	0	44,570	60
Kiruna	Kiruna Värmeverk	47,280	5,490	139,670	12,740
Kumla	Ekokem Förbränning	*	*	*	*
Köping	Norsa avfallsförbränningsanläggning	24,210	15,440	61,760	0
Lidköping	PC Filen	112,370	20,790	338,040	31,640
Linköping	Gärstadverket	514,140	91,930	1,260,470	221,480
Ljungby	Ljungby Energi AB	48,370	48,370	135,100	9,590
Malmö	Sysav förbränningsanläggning	615,840	187,940	1,449,830	169,350
Mora	Avfallsförbränningen Mora	*	*	*	*
Norrköping	E.ON Händelöverket	330,000	22,000	791,000	90,000
Nybro	Kraftvärmeverket Transtorp	56,700	56,690	258,450	28,300
Sigtuna	Brista kraftvärmeverk	176,350	58,370	468,610	80,430
Skövde	Värmekällan	58,270	34,960	160,020	4,820
Stockholm	Högdalenverket	750,380	279,270	1,633,000	216,200
Sundsvall	Korsta kraftvärmeverk	164,240	60,800	418,570	48,650
Södertälje	Söderenergi	484,640	0	1,663,960	276,950
Uddevalla	Lillesjö Avfallskraftvärmeverk	113,560	40,990	252,550	65,690
Umeå	Dåva kraftvärmeverk	156,560	79,520	381,050	53,730
Upplands-Bro	Högbytorp kraftvärmeverk	229,200	0	611,800	0
Uppsala	Vattenfall AB Värme Uppsala	313,430	91,280	1,065,840	14,800
Västervik	Stegeholmsverket	41,720	13,800	114,420	23,330
Västerås	Västerås Kraftvärmeverk	625,130	162,370	1,415,890	400,070
Total		**6,655,900**	**1,936,510**	**17,266,300**	**2,347,610**

Avfall Sverige's statistics mainly relate to waste incineration plants that receive household waste. All but one also accept other waste. Three plants do not accept household waste, but are members of Avfall Sverige and are included in the statistics.
The total amount of waste also includes imported waste.
Energy recovery relates to total waste, not just household waste.
*) The plants accept household waste but have not reported data in 2023.

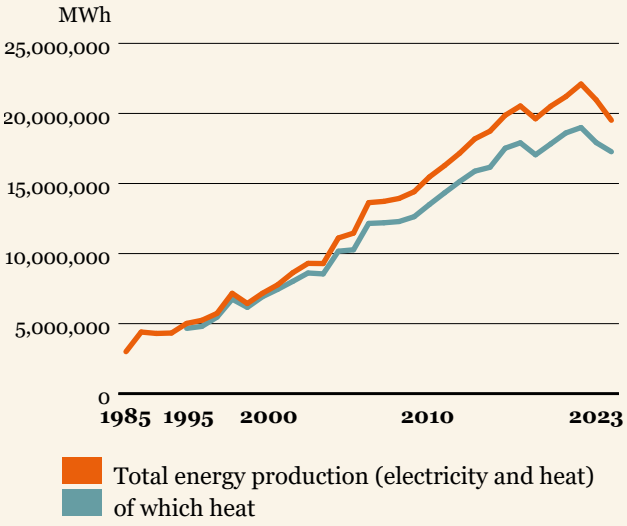
Energy recovery 2019–2023

	2019	2020	2021	2022	2023
Incineration (tonnes)					
Household/municipal waste	2,426,610	2,240,990	2,468,270	2,066,340	1,936,510
Business waste	4,281,900	4,646,980	4,510,220	4,762,840	4,719,370
Total	**6,708,510**	**6,887,970**	**6,978,490**	**6,829,180**	**6,655,900**
Production (MWh)					
Heating	17,824,810	18,607,670	18,994,400	17,920,670	17,266,300
Electricity	2,296,890	2,593,970	3,104,700	3,045,280	2,247,610
Total	**20,121,700**	**21,201,640**	**22099100**	**20,965,950**	**19,513,910**
Slag, bottom ash (tonnes)	1,192,270	1,024,510	1,027,440	1,066,930	949,710
RGR, fly ash (tonnes)	293,070	303,060	299,370	266,840	278,710

Waste to energy recovery 1985–2023



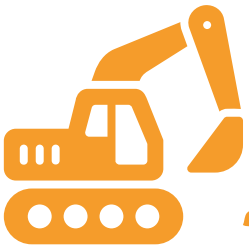
Energy production from waste 1985–2023



Waste treatment plants with landfills

Landfill

1.2 GWh heating
0.04 GWh electricity



30,720 tonnes
of household waste was sent to landfill by the plants according to Avfall Web 2023

In 2023, a total of 1.4 million tonnes of waste went to landfill at 66 of the 106 plants reporting in Avfall Web[64]. These plants received 30,720 tonnes of household waste, which represents 2 percent of the total amount sent to landfill.

Landfill is the treatment method used for waste that cannot or should not be treated in any other way, such as asbestos and certain types of contaminated excavated materials. In today's landfills at modern waste treatment plants, the sorting of materials for processing, reuse, material recycling and energy recovery is also a major part of the operation in order to optimise the use of resources according to the waste hierarchy. The plants are also used as temporary storage for waste fuel and for waste that will be sent for material recycling, such as metal, cardboard and glass. In many cases, the plants also treat biodegradable waste and contaminated excavated material.

When a landfill is filled and its capacity is exhausted, it is capped with materials and an impermeable layer, partly to prevent rainwater from entering and contaminating the waste. Today, materials such as slag, sludge, ash and excavated materials are used in the various capping layers. Stricter legal requirements were introduced in 2008, so many landfills in Sweden are now being shut down and capped through 2030.

LANDFILL GAS AND LEACHATE

Landfill gas is produced at a landfill where organic waste was deposited in the past[65]. The gas is approximately 50 percent methane. The rest is carbon dioxide, nitrogen, and small amounts of other gases. Since landfill gas contains methane, it must be collected to reduce its climate impact. Since the ban on organic waste going to landfill was introduced, the formation of gas at landfill sites has progressively decreased.

In 2023, approximately 110 GWh of landfill gas was collected at 39 waste treatment plants, of which 60 GWh was used for energy.

Energy recovery consisted of approximately 1.8 GWh in the form of electricity and 58 GWh in the form of heating. In all, 50 GWh of landfill gas was flared. Flaring does not produce energy but reduces methane emissions when the gas is incinerated. The flaring of landfill gas is necessary when it is not possible to remove it or to use it in some other way.

Landfills are built with a bottom barrier layer to make it possible to collect and purify the resulting leachate and prevent it from spreading to the environment. Leachate is defined as water which has been in contact with the landfill material and is discharged from or is retained in a landfill. In 2023, 9.6 million cubic metres of leachate was processed at 92 waste treatment plants. This includes contaminated surface water from operational areas in cases where all of the water is handled in the same treatment process.

64 The difference from previous years may be partly due to the fact that three plants that previously reported approximately 1 million tonnes have not reported data for 2023. The total volume of waste sent to landfill at individual plants can vary significantly from year to year due to a varying need to send ash and contaminated excavated material to landfill.
65 Avfall Sverige Report D2013:02 Landfill gas handbook

Waste is still sent to landfill at 58 plants with leachate treatment. Less than half of the plants report that leachate is diverted to municipal wastewater treatment plants after various degrees of local treatment. Other plants report that leachate is treated locally before being released to recipients. Landfill gas and leachate are also collected from closed and capped landfill sites.

READ MORE IN AVFALL SVERIGE'S REPORTS

- 2015:09 Landfill waste – mapping and possible disposal
- 2015:13 Decision-making support for handling landfill emissions during capping
- 2016:01 Trends for waste treatment plants with landfill – statistics 2008–2014
- 2016:11 Aerated ponds
- 2016:32 When is active management of landfill gas no longer necessary?
- 2017:04 Decision-making support for recycling granulated slag in specific asphalt-covered construction structures
- 2017:28 Characterisation of surface water from different types of activities and waste
- 2017:34 Application of the law on tax on waste
- 2017:36 Handbook for assessing leachate and contaminated surface water at waste treatment plants
- 2018:09 Fire safety during storage of waste fuel
- 2018:13 Guide for classifying incineration residues with calculation methods
- 2018:21 Microplastic in treated leachate
- 2018:25 PFAS at waste treatment plants
- 2018:36 Increased sorting of construction and demolition waste
- 2019:01 Updated assessment criteria for contaminated excavated material
- 2019:13 Guide on BAT conclusions for waste treatment (WT-BREF)
- 2019:26 Analysis of socio-economic consequences of landfill tax in Sweden
- 2020:09 System for wireless temperature monitoring during storage of waste fuel/biofuel and compost
- 2020:11 Surface emissions of landfill gas
- 2020:14 Treatment of leachate with sulphate-reducing bacteria
- 2020:26 Treatment methods for contaminated surplus material
- 2021:02 Treatment of PFAS-contaminated water from waste treatment plants
- 2021:05 Evaluation of PFAS purification effect in two full-scale plants
- 2021:06 Avfall Sverige's landfill handbook 3.0 Revised landfill handbook – part of the waste management of tomorrow
- 2021:07 General briefing on BREF documents and BAT conclusions for the waste industry
- 2021:15 Handling and disposal of soils with invasive species – Asian knotweed
- 2022:06 Measurement of emissions and exposure of personnel when handling small chemicals at waste treatment plants
- 2022:10 Future utilisation of landfill sites
- 2022:18 Surface active foam fractionation – SAFF, for leachate treatment – a full-scale trial
- 2023:05 Literature study – Filter-based treatment techniques for stormwater from waste treatment plants and recycling centres
- 2023:09 Purification of PFAS-contaminated leachate through an ion exchange process; pilot regeneration trial
- 2023:15 Waste fires, emissions and risks
- 2023:25 Treatment of excavated materials contaminated with PFAS before landfilling or reuse
- 2024:08 Reduced landfilling of insulation
- 2024:14 Knowledge synthesis on methane emissions in the waste sector

Plants that send household waste to landfill 2023

Municipality	Plant	Total, tonnes	of which municipal waste, tonnes	Recovered energy, MWh
Alingsås	Bälinge	900	580	710
Arvika	Mosseberg Deponi	2,460	380	410
Borlänge	Fågelmyra Avfallsanläggning	10,240	1,740	40
Borås	Sobackens Deponi	106,710	120	150
Bromölla	Åsens avfallsanläggning*	3,870	620	0
Dorotea	Bergvattnet	50	50	0
Eda	Lunden	440	100	0
Eslöv	Rönneholms avfallsanläggning	710	380	190
Grums	Karlbergs avfallsstation	50	50	0
Gällivare	Kavahedens Avfallsanläggning	2,870	2,870	0
Hagfors	Holkesmossen avfallsanläggning	2,990	1,250	0
Halmstad	Skedala AFA (Brogård)	4,320	470	0
Helsingborg	NSR Deponianläggning	5,190	400	0
Hultsfred	Kejsarkullen	110	70	0
Härnösand	Ålands avfallsanläggning	12,180	160	0
Hässleholm	Vankiva Aktiva deponier	120,310	120	0
Jönköping	Miljöhantering i Jönköping	5,290	800	0
Kalmar	Moskogens avfallsanläggning	37,090	190	0
Karlskoga	Mosseruds Återvinningsanläggning	3,820	1,250	0
Karlskrona	Mältans avfallsanläggning (1)	3,170	870	0
Karlstad	Avfallsupplag Djupdalen	13,570	1,600	0
Kil	Lersätters avfallshanteringsområde	20,660	190	0
Kiruna	Kiruna deponi	1,440	160	0
Klippan	Hyllstofta avfallsanläggning	280	50	1,090
Kramfors	Högbergets avfallsanläggning	6,360	290	0
Laholm	Ahla deponi och återvinningscentral	1,120	330	0
Lidköping	Kartåsens avfallsanläggning	25,620	260	0
Linköping	Gärstad avfallsanläggning	3,050	1,770	0
Ljungby	Bredemads avfallsanläggning	2,530	650	0
Ludvika	Björnshyttans avfallsanläggning	330	330	0
Lycksele	Lycksele Deponi	350	350	0
Malmö	Spillepengs avfallsanläggning	19,450	100	7,650
Motala	Tuddarps avfallsanläggning	2,810	290	0
Orust	Månsemyrs deponi i drift	330	180	0
Oskarshamn	Storskogens avfallsanläggning	3,270	180	0
Piteå	Bredviksbergets avfallsanläggning	5,910	370	0
Skellefteå	DEGERMYRAN	15,480	620	0
Sunne	Holmby Avfallsanläggning	1,770	390	0
Söderhamn	Långtå avfallsanläggning	3,530	150	0
Umeå	Dåva Deponi- och avfallsanläggning	64,600	870	0
Uppsala	Hovgårdens avfallsanläggning	5,670	50	0
Vetlanda	Flishults avfallsanläggning	73,470	500	0
Vänersborg	Ragn-Sells Heljestorp	167,460	1,070	2,420
Vännäs	Starrbergets avfallsanläggning (new)	15,750	3,370	0
Västervik	Målserums avfallsanläggning	2,420	150	0
Växjö	Häringetorp behandlingsanläggning	79,310	2,080	430
Ystad	Hedeskoga avfallsanläggning	5,390	890	1,810
Älmhult	Äskya	3,060	50	0
Örebro	Atleverket	108,090	390	4,220
Östersund	Gräfsåsens deponi	8,500	570	0
Other plants in Avfall Web		478,900**		40,650
Total		**1,463,250**	**30,720**	**59,770**

The table only reports the plants that send household waste to landfill (and that entered a value in Avfall Web).
Avfall Sverige's statistics covers a total of 106 plants.
* values from 2022
** Three plants that previously reported approximately 1 million tonnes of landfilled waste have not reported data for 2023

Volumes sent to landfill 2019–2023 (tonnes)

	2019	2020	2021	2022	2023
Volume sent to landfill	2,649,310	2,782,750	2,738,060	2,841,350	1,463,250
of which household/municipal waste	37,370	42,500	44,220	34,100	30,720

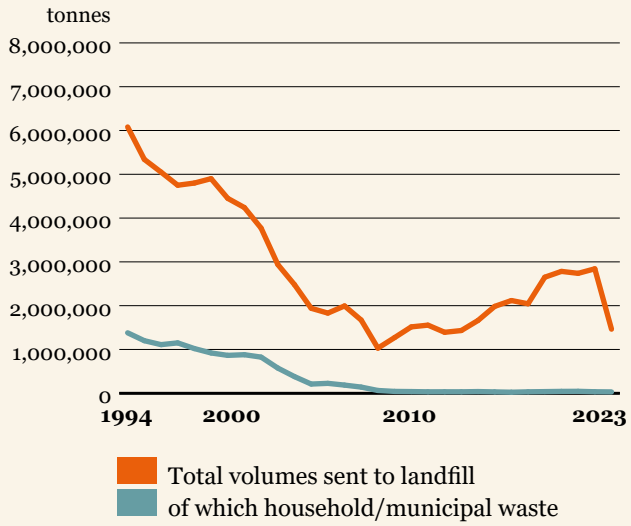
Avfall Sverige's landfill statistics do not provide a complete picture of landfill in Sweden. Initially, the idea was to keep statistics on plants that accepted household waste. Today, many of these plants no longer accept household waste.
There is some uncertainty about the figures for household waste, as it is not always possible to distinguish flows of household waste from other waste.

Energy recovery at landfill sites 2019-2023 (MWh)

	2019	2020	2021	2022	2023
Useful energy	94,220	82,750	80,020	75,630	59,770
of which electrical energy*	4,150	3,180	3,350	3,160	1,790
Flaring	41,990	53,050	70,380	54,140	50,140

* Other energy is used for heating

Volumes sent to landfill 1994–2023



The difference from previous years may be partly due to the fact that three plants that previously reported approximately 1 million tonnes have not reported data for 2023.

Charges, costs and instruments of control

Municipalities and producers handle the management of municipal waste. The cost to municipalities is recouped through waste charges, which are set by the municipal council. Producers' costs are recouped through a charge on the product. The producers determine what this charge should be themselves.

As a rule, the municipality's waste charges cover the total cost of municipal waste management, but any deficits that occur may be funded through taxation. Administration, such as waste planning, customer service, invoicing and information are included in the costs. In addition, the charge must cover the cost of service at recycling centres, such as receiving bulky waste and hazardous household waste.

The charge is often divided into a fixed and a variable fee, for example one fee for waste collection and one for waste treatment. According to the prime cost principle in the Local Government Act, the municipalities' revenue from the waste charges may not exceed their costs for waste management.

AVERAGE CHARGE

A Swedish single-family household paid an average of SEK 2,737 in waste charges in 2023 according to data from Avfall Sverige's statistics system Avfall Web. This is an increase of 8 percent compared to 2022. Households in apartment blocks paid an average of SEK 1,684, and the average charge for second homes was SEK 1,706 in 2023. The increase for apartments and second homes is 10 and 13 percent, respectively, compared to the previous year. On average, the basic charge makes up 46 percent of the total charges for single-family houses. On average, a Swedish household pays SEK 6 per day for waste management.

Many municipalities that introduced the voluntary collection of food waste use the charge as an incentive[66]. Then, for example, households that separate food waste pay a lower charge than those that choose to leave mixed waste for collection. As of 2024, it is mandatory for all households and businesses to separate food waste, so this type of environmental management will cease.

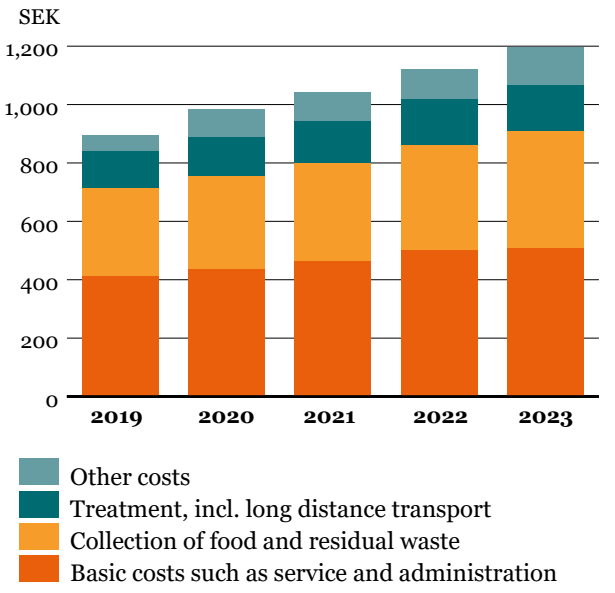
To achieve a higher material recycling rate for waste, several municipalities have introduced a weight-based charge, where households pay an additional rate per kilo of waste collected on top of the basic charge[67]. In such case, collection vehicles are equipped with a scale and equipment to identify each individual bin. The total annual cost for weight-based charges varies depending on the quantity of waste left for collection. The charge varies between SEK 1.80 and SEK 5.30 per kg for residual waste and between SEK 0 and SEK 4.60 for a food waste bin, combined with various types of bin charges and the fixed basic charge. 36 of the country's municipalities had a weight-based charge in 2023. Some municipalities with food waste collection have lower weight charges for food waste; in some municipalities it is free.

In 2023, the total cost for waste management to municipalities was on average SEK 1,197 per person, excluding VAT. The municipal cost for the collection of food and residual waste averaged SEK 402 per person, and the cost of treatment averaged SEK 155 per person. The basic cost averaged SEK 508 per person. The cost per household is generally higher in municipalities with small populations versus those with large ones[68].

Tax on waste sent to landfill was introduced in 2000 as a way to reduce landfill. The tax was initially SEK 250 per tonne, but has since been raised several times. In 2024, the tax was SEK 725 per tonne.

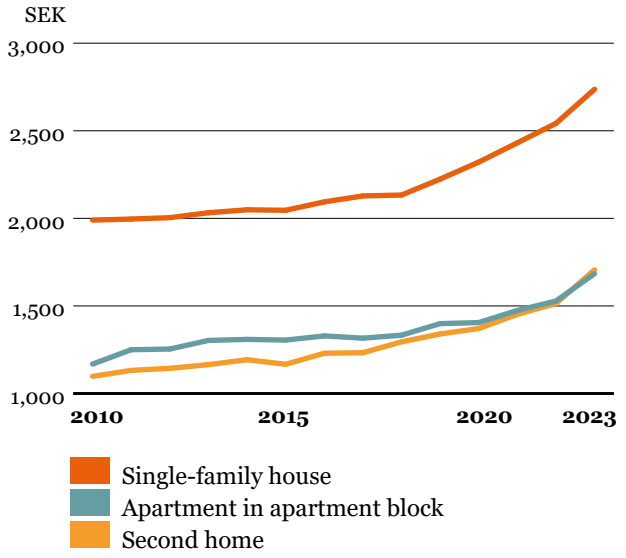
Municipalities often pay a charge to get their waste treated. Treatment charges can vary greatly.

Waste management costs, SEK per person excl. VAT, 2019–2023

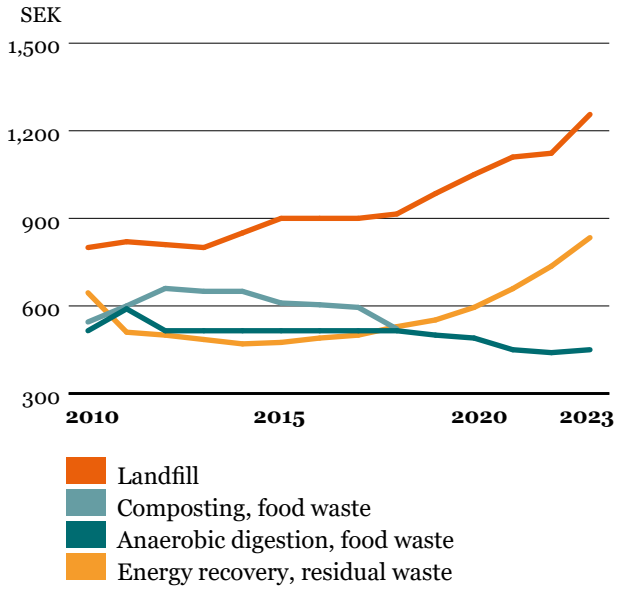


66 Avfall Sverige Report 2020:28 Eco-based waste charges – use, effect and good examples.
67 Avfall Sverige Report U 2014:05 Eco-based charge? A guide to weight-based waste charge prior to decision, for implementation and operation
68 Avfall Sverige Report 2016:29 Calculation of waste management costs in Sweden municipalities

Average waste charges per household SEK, incl. VAT, 2010–2023



Treatment charges excl. VAT 2010–2023, SEK per tonne



As of 2019, the composting of food waste is no longer presented due to too few values.

Treatment charges per tonne, in SEK and excl. VAT 2023

	Anaerobic digestion, food waste	Energy recovery, residual waste	Landfill
Average	450	830	1,250
Interval	150-870	560-1,090	780-1,860

The treatment charge refers to the median in Avfall Web. The interval shows the normal distribution of waste treatment charges.

The charge for energy recovery from residual waste was SEK 830 in 2023, an increase of 13 percent compared to 2022. The large increase is due to factors such as an increase in the cost of emission allowances for plants. The charge for anaerobic digestion increased by two percent (from SEK 440 to SEK 450) in 2023, and the charge for landfill increased by 12 percent.

INSTRUMENTS OF CONTROL

There are several international, national and local mechanisms in place to reduce the environmental impact of waste management, improve resource efficiency and increase recovery. These can be information or administrative and financial instruments. Administrative instruments include regulations and bans, such as bans on landfilling organic waste and mandatory food waste collection. Properly formulated financial instruments can either be an incentive, like tax relief and subsidies, or a penalty, like taxes and charges. One basic principle is that the polluter should pay.

Swedish households pay, on average, the price of an apple per day to have food and residual waste collected kerbside and to have access to recycling centres to turn in bulky waste and hazardous waste.

READ MORE IN AVFALL SVERIGE'S REPORTS

- 2022:15 Guidance for structuring waste charges
- Household waste in figures 2022

Total volume of waste generated in Sweden

According to the EU's Waste Statistics Directive, each member state must report its country's statistics once every two years. Data on all waste in Sweden can be found in the official statistics, which are reported to the EU via the Swedish Environmental Protection Agency.

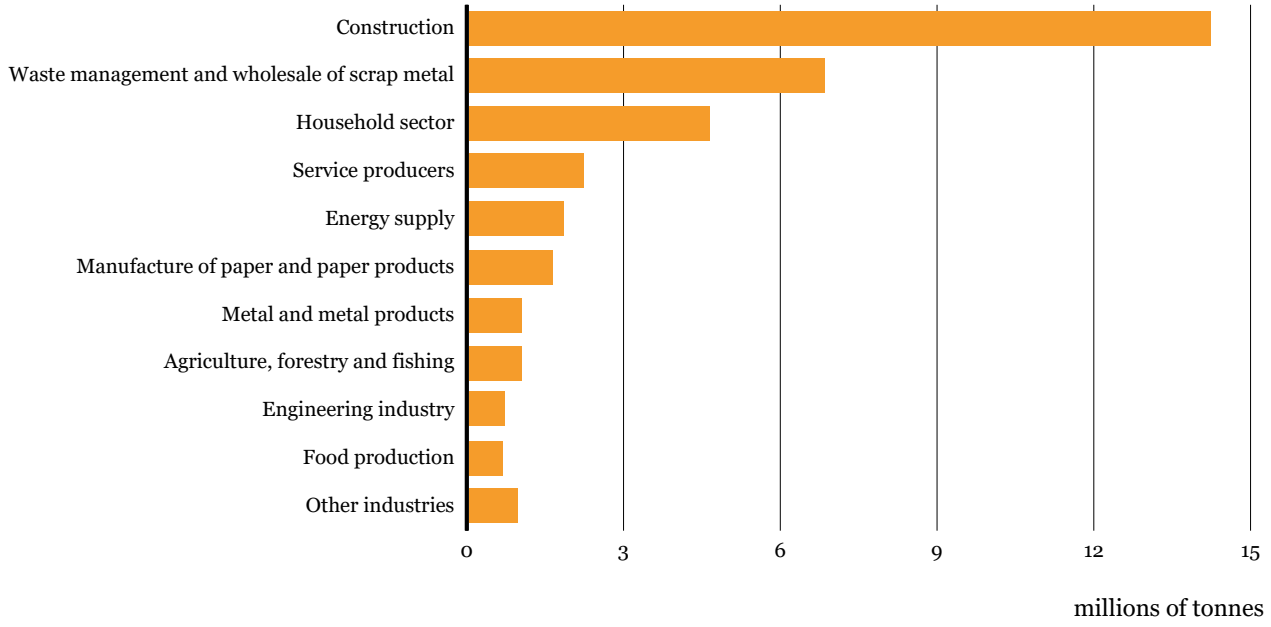
The latest statistics relate to waste volumes for 2020[69]. At that time, 152 million tonnes of waste were generated in Sweden, of which 8 million tonnes were hazardous waste. The majority of the generated waste, 76 percent or 116 million tonnes, consisted of mining waste from the mining industry. 35.7 million tonnes were generated in other industries and households. The entire EU generates approximately 2.5 billion tonnes of waste each year.

Businesses are responsible for managing their own non-municipal waste. Some businesses have their own landfill sites at their disposal or can recover energy from waste in their own plants.

Construction and demolition waste is waste from construction, renovation, rebuilding or demolition of buildings, or from more extensive construction work in gardens. The municipality is not responsible for collecting or handling such waste. However, construction and demolition waste generated in non-professional activities, for example when a private individual performs DIY renovations at home, is included in the municipality's collection and treatment responsibility since January 2023. Some construction and demolition waste is classified as hazardous waste, for example asbestos and impregnated timber, and must be handled accordingly. According to the Swedish Environmental Protection Agency's calculations, 40 percent of all waste produced in Sweden is generated by the construction sector (mining waste excluded). Construction and demolition waste is therefore prioritised in the national waste plan and in the waste prevention programme.

The waste hierarchy serves as guidance for how waste is treated, and has been integrated in the Swedish Environmental Code since 2016. The national waste statistics also include final treatment of waste at the three levels material recycling, other recycling (e.g. energy recovery), and disposal. In 2020 in Sweden, 6.3 million tonnes of waste underwent material recycling, 17 million tonnes were recycled in other ways, and 5.3 million tonnes of waste were disposed of. Mining waste is excluded from these statistics.

Total waste generated in Sweden, excl. mining waste 2020



Total waste generated in Sweden in 2020, excluding mining waste, reported for various industries. The industries that generated the most waste are reported separately. The remaining industries are reported together under Other industries.

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2023 in brief

AVFALL SVERIGE

- Much of Avfall Sverige's work in 2023 focused on preparing for municipalities' collection responsibility for packaging and mandatory separation of food waste, both to be introduced from 1 January 2024. A wide range of webinars were broadcast, and guides and templates were produced to help members. In addition, a campaign was created – "And the recycler is YOU!" (Och återvinnaren är DU!) – and a hub for finding the nearest recycling station/centre was launched on sopor.nu.
- The Swedish term "fulplast" was launched to represent non-recyclable plastic as part of the "Stop non-recyclable plastic" (Stoppa fulplasten) campaign, aimed at minimising the volumes of plastic and putting pressure on producers to use recyclable plastics in what they send to market.
- International efforts gained momentum. Within the framework of cooperation with the UN Development Programme, UNDP, a digital training course on sustainable waste management was launched; Smart City Sweden also participated in the work. Sida also decided to support Avfall Sverige and Salar International to strengthen waste management in Ukraine.
- A collaboration with the Swedish Institute resulted in an exhibition on the Swedish waste sorting signage system, which toured Swedish embassies around the world.
- The annual meeting in Kalmar attracted over 600 participants and 43 exhibitors.
- The autumn meeting in Uppsala gathered more than 500 participants around the theme of collection.
- Avfall Sverige participated in Almedalen on issues such as the new collection system, plastics and preparedness.
- The popular handbook for waste facilities was updated, and a new handbook on safer reuse was drawn up. In addition, 30 reports from the development programme were published.
- Four new staff members were hired: Natalie Svensson as new Digital Communications Officer, Carolina Tufvesson as Assistant Advisory Consultant, Tina Svensson as Accounting Assistant, and Angelika Blom as Advisory Consultant. Their contact details can be found on the last page.

SWEDEN

- Pending an EU decision on producer responsibility for textiles, the Government decided on separate collection and recycling of textile waste from 1 January 2025, with municipalities remaining responsible for collection.
- The tax exemption for Swedish biogas was withdrawn due to a procedural error that invalidated the European Commission's decision. This led to a sharp increase in biogas prices, causing difficulties for producers. (The European Commission opened an in-depth review of biogas tax exemption in January 2024, raising hopes that it could be reinstated).
- The Government decided to extend the fertiliser gas subsidy – a small relief after the withdrawal of the tax exemption.
- The tax on waste incineration was abolished at the start of 2023, as was the carbon tax on combined heat and power production.
- Charges were filed against Think Pink in what is described as Sweden's biggest ever environmental crime case.
- Plastics remained a major issue in 2023, in terms of production, consumption and waste management. Several municipalities introduced rigid plastic as a separate fraction at recycling centres to increase material recycling.
- Swine fever spread in the forests outside Fagersta. With no evidence that the spread of the disease was linked to local waste management, the Swedish Board of Agriculture nevertheless decided to close a recycling centre. The outbreak also triggered a discussion on how the transfer of food waste should be handled to reduce the possible spread of infection.
- Nitrous oxide cylinders grew into an extensive and expensive problem for municipal waste management, as the quantities are increasing rapidly, they require special handling (dangerous goods) and no compensation for collection is paid by the producers. However, Avfall Sverige has noted that nitrous oxide cylinders are covered by the producer responsibility ordinance.
- Svensk Plaståtervinning opened its new plant for sorting plastic packaging in Motala.
- Förpackningsinsamlingen, FTI, was closed down and replaced with Näringslivets Producentansvar, NPA, on 1 January 2024. This became a new and important partner for Avfall Sverige.
- CCS remained a major issue in 2023, including for Sysav, which opened its pilot plant.
- Stockholm's supervisory authority ruled against McDonald's – they are required to separate packaging waste for recycling.

EU AND GLOBAL

- New rules on biowaste were adopted by the EU, banning food waste and garden waste from being discarded in residual waste from 2024.
- The European Commission proposed producer responsibility for textiles and quantitative targets to reduce food waste.
- The Ecodesign Regulation is well on its way to a final decision in the Council of the European Union through a provisional agreement between the European Parliament and the Council. It contains a wide range of rules to make sustainability the norm.
- As part of the EU's goal to harmonise the collection systems of Member States, the EU's research institute JRC has launched a study to "investigate" different existing product and collection labelling systems, including the Nordic signage system.

Waste agenda

2035

Maximum 10 percent of municipal waste may go to landfill. The EU countries that sent 60 percent or more of their municipal waste to landfill in 2013 have been granted a five-year extension.

Preparation for reuse and recycling of municipal waste shall be at least 65 percent by weight.

Maximum 10 percent

2030

Preparation for reuse and recycling of municipal waste shall be at least 60 percent by weight.

2029

For all packaging waste, the target is to achieve a recycling rate of at least 65 percent per year by 2029 and at least 70 percent thereafter.

2027

Municipalities shall have introduced kerbside collection of packaging from households and co-located businesses.

Municipal biowaste that undergoes anaerobic or aerobic treatment may be counted as recycled only if it has been collected separately or has been source-separated (EU requirement).

2026

The municipalities are responsible for collecting packaging at popular locations, such as squares and parks.

2025

Preparation for reuse and recycling of municipal waste shall be at least 55 percent by weight.

From 1 January, separate sorting and collection of textile waste will be mandatory. The separate collection of, as a minimum, paper, metal, plastic and glass (this refers to waste other than packaging waste) will be required. No requirements for separate collection have yet been regulated in Swedish legislation for fractions other than textile waste, with the exception of construction and demolition waste.
Producer responsibility for fishing gear will be introduced from 1 January. Requirement for separate sorting of fishing gear. The municipalities are responsible for collecting fishing gear from non-commercial activities at recycling centres and for fishing gear from ships at port receiving facilities. The municipalities will be compensated for collection in accordance with future regulations from the Swedish Environmental Protection Agency.

2024

The municipalities took over responsibility from producers for the collection of packaging from households and registered co-located businesses.

Separate sorting of biowaste became mandatory for both households and businesses. The municipalities are obliged to collect the separated food waste that falls under municipal responsibility. Separation of packaging from its contents (except for hazardous waste and pharmaceuticals) is mandatory.

The Swedish Environmental Protection Agency is conducting a review of Sweden's waste plan and waste prevention programme, which is expected to be completed by 31 October 2024. The review will help to prevent the generation of waste and ensure that waste is managed in accordance with the waste hierarchy.

About Avfall Sverige

Avfall Sverige is the municipalities' trade association in the field of waste management and recycling. Avfall Sverige's members ensure that waste is collected and recycled in all Swedish municipalities. We perform our work on behalf of society: in an environmentally sound, sustainable and long-term manner. Our vision is "Zero Waste". We are taking action to minimise waste, promote reuse and ensure that the waste produced is recycled, recovered and managed in the optimal manner. Municipalities and their enterprises are the ambassadors, catalysts and guarantors of this change.

There are two categories of members at Avfall Sverige:

- Municipalities, municipal enterprises, municipal associations, etc. whose work is based on public duties and tasks. These members have the right to vote at annual meetings and make decisions on Avfall Sverige's statutes and policies, etc.
- Associate members are private sector stakeholders, including consultants and suppliers of services and equipment.

ANNUAL MEETING AND THE BOARD

Avfall Sverige's highest decision-making body is the annual meeting, which makes decisions regarding bylaws, policies, budget framework, the Board and the Nominating Committee. In policy matters, Avfall Sverige's opinions and positions are established by the Board after being prepared by working groups, the Development Committee and the Administrative Office. Avfall Sverige's Board consists of 18 directors, of whom ten are elected representatives and eight are civil servants. All directors have term of office lasting two years. The annual meeting adopted revised bylaws in 2022.

NOMINATING COMMITTEE

The Nominating Committee consists of seven members, of whom four are elected representatives and three are civil servants. The principal auditor and one alternate auditor are elected to serve for a period of one year at the annual meeting.

AVFALL SVERIGE'S WORKING GROUPS

Avfall Sverige's broad area of operation is reflected in the eight working groups, in which representatives of its members (primarily municipalities) participate. The Administrative Office's advisory consultants, who are specialists in different areas, participate in the relevant group. Within the working groups, there are 17 different operational groups, where members work with issues related to specific operational areas. No less than 200 member representatives are involved in at least one working group or one of its operational groups. Working groups are an important link between the members and the Administrative Office, as well as member-to-member.

ADVISORY SERVICES

Members can make use of Avfall Sverige's specialist expertise via Avfall Sverige's reports, guides, handbooks and training courses or by contacting the Administrative Office directly. The advisory services are highly appreciated, with advice provided by phone and email, through guides and handbooks, and in the form of contract and procurement templates and standard agreements. Digital "live member advice" is a valued support, as it enables urgent information to quickly be made available to all members. Avfall Sverige often acts as intermediary between members and others who can contribute more knowledge and experience on various issues.

MEMBERSHIP DEVELOPMENT IN 2023

In 2023, Avfall Sverige had 218 municipal members, representing all of Sweden's 290 municipalities, directly or indirectly through their regional companies and municipal associations. There were also 149 associate members.

NATIONAL AND INTERNATIONAL COLLABORATION AND NETWORKS

Avfall Sverige collaborates extensively with other organisations in Sweden and abroad. External collaboration benefits Swedish waste management and the members of the association.

Examples of organisations we work with:

- Swedish Association of Local Authorities and Regions (SKR)
- Swedish Environmental Protection Agency
- Energiföretagen Sverige
- Swedish Gas Association
- Svenskt Vatten
- Keep Sweden Tidy

Examples of international collaboration:

- Municipal Waste Europe, MWE, which represents the interests of municipalities and municipal enterprises in the EU.
- CEWEP (Confederation of European Waste-to-Energy Plants), which represents the interests of stakeholders in the energy recovery sector.
- ECN (European Compost Network), which works with issues related to biological treatment at the EU level.
- ISWA (International Solid Waste Association), the global waste organisation
- UNDP, United Nations Development Programme, collaboration with Avfall Sverige on improving waste management globally.

Avfall Sverige's advisory consultants contribute their particular expertise in each organisation.

QUALITY CERTIFIED OPERATIONS

Avfall Sverige's entire operations have been quality certified according to ISO 9001:2015 since 2018. Quality work is an important part of our operations.

DEVELOPMENT OF THE INDUSTRY THROUGH TRAINING INITIATIVES

Avfall Sverige has an extensive training programme designed to increase the level of knowledge and competence in the industry. It consists of courses, theme days and contracted courses. The focus of the training programme is anchored in the working groups and responds to the needs of members and the industry alike. 25 courses and theme days were held in 2023, of which 6 were organised digitally.

COMMUNICATION AND EXTERNAL MONITORING

Avfall Sverige carries out broad external monitoring of environmental and climate issues related to waste management, as well as of purely factual issues related to waste. In addition to using this in the Administrative Office's own lobbying work, we disseminate this knowledge to members, primarily via Avfall Sverige's website, newsletter and magazine.

NATIONAL LOBBYING AND DIALOGUE WITH DECISION MAKERS

Avfall Sverige is an active participant in government inquiries and when new bills are prepared. At meetings with the Government Offices, MPs, government officials and government agencies, Avfall Sverige is often represented by the Managing Director and various consultants. Board representatives and members also participate at times. Avfall Sverige's CEO is a member of the Circular Economy Delegation.

On several occasions each year, Avfall Sverige – along with its allied organisations Energiföretagen Sverige, the Swedish Gas Association, and Svenskt Vatten – organises meetings with MPs and attends municipal days and congresses arranged by the parties represented in the Swedish Parliament.

Avfall Sverige also participates actively in lobbying through opinion pieces and replies, either independently or with other actors.

CONSULTATIVE RESPONSES

As a representative of the municipalities and their waste management, Avfall Sverige plays an important role as consultative body and actively contributes opinions ahead of political decisions through its official consultative responses. The organisation therefore has ongoing contact with the Parliament and Government, as well as with a number of authorities in issues related to waste management. In addition to consultative responses, Avfall Sverige provides opinions on issues affecting the industry.

FUNDING

Avfall Sverige's activities are mainly budget-based and they follow the mission statement that is approved through the general budget at the annual meeting and through the detailed budget by Avfall Sverige's Board. Revenues are made up, in basically equal proportions, of membership dues and fees on the one hand and income from commercial activities such as courses, conferences, consulting assignments, publications, etc., on the other. All members pay membership dues and a service fee. Dues and service fees for municipal members (municipalities, municipal enterprises and similar) are based on the size of the population. For associate members, the fee is a fixed charge at three levels, depending on the size of the company.

AVFALL SVERIGE'S DEVELOPMENT INITIATIVE

Avfall Sverige champions issues and runs projects in accordance with the waste hierarchy and with the aim of achieving better waste management in society. The organisation invests significant resources in projects intended to move the industry forward.

Avfall Sverige's development initiative began in 1998. Since then, approximately 580 development projects with a total cost of approximately SEK 150 million have been approved. Together with its members, Avfall Sverige has successfully developed the waste industry since that time through relevant, accessible and useful projects.

The projects are based on member involvement, including through questions brought up in the working groups, which gives them a firm footing within the association. They are also relevant to the majority of Avfall Sverige's members.

DEVELOPMENT COMMITTEE

Avfall Sverige's Board appoints the Development Committee, which consists of the association's eight working group chairs, one other representative of the municipalities, and the Managing Director of Avfall Sverige. With input from the working groups, the Committee decides which products should be granted funding and how the funds should be allocated.

OTHER DEVELOPMENT INITIATIVES

Three of the working groups have their own development initiatives, which they fund and decide on themselves. These working groups are energy recovery, biological treatment and waste treatment plants.

REPORTS:

The results of Avfall Sverige's development initiatives are presented first and foremost in the form of reports on the Avfall Sverige website. Avfall Sverige publishes approximately 30 reports annually. Since 2008, the reports are distributed in electronic form only. Isolated reports and handbooks are published in printed format. As of 2019, the reports are also summarised in simple presentations, available to all members on Avfall Sverige's website.

Here, in Swedish Waste Management, you will find references to a selection of reports, listed under "Read more" in most chapters. You can also find additional reports in various areas on our website by filtering the reports by topic.

AWARD OF SCHOLARSHIPS

Avfall Sverige has been awarding scholarships within the waste management field every year since 2005. The scholarships are awarded for the most deserving papers and degree projects at the undergraduate level at Swedish universities. The Development Committee decides who will be awarded a scholarship.

SUPPORT SYSTEMS

Avfall Sverige provides various support systems for its members, including Avfall Web, the waste indices, certified recycling of digestate and compost, and self-inspection of methane emissions. Avfall Web is a web-based statistical system developed to support members in planning, benchmarking and monitoring.

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