

2022

Swedish Waste Management



AVFALL SVERIGE

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Preface

Swedish Waste Management 2022 gives you lots of information about how household waste is treated and converted into new materials, biogas and energy. In simple terms, it is the WHEN, WHERE and HOW of waste.

The global events of 2022 reminded the world of the importance of this sector. For example, Russia's full-scale invasion of Ukraine gave biogas a more important role in replacing imported Russian fossil gas in Europe. Sweden has invested heavily in being able to recycle food waste and fertiliser into biogas. Our payoff is fantastic digestate that can be returned to the fields. This is a good example of how cycles can be closed and made circular. The fact that increased self-sufficiency in energy and sustenance strengthens Sweden is another reason to continue along this path.

The electricity and heat we generate through energy recovery from waste also provided security in troubled times. In 2022, much work has been done to minimise climate emissions from these plants, both by reducing the amount of plastic received and through planned efforts for carbon capture and storage (CCS).

REDUCED VOLUMES

On a particularly positive note in 2022, the statistics show a reduction in waste volumes, from 475 to 449 kg per person. This is a very welcome break in the trend after the volumes, with a few exceptions, have increased almost every year so far. The reduction is so significant that we can hope that it is a permanent change.

Preventing waste – reducing the volumes produced – is one of our most important tasks. Avfall Sverige's vision, Zero Waste, is the guiding principle. The vision helps us to work towards the development of a sustainable society. The voluntary 25/25 goal has become a way for many municipalities to work with this issue. This means that we are striving to reduce food and residual waste volumes by 25 percent (compared to 2015 figures) by 2025. We can see that things are progressing in the right direction, but the pace needs to be stepped up.

In 2022, important steps were taken in the EU to contribute to our vision, particularly through the Ecodesign proposal, which aims to make sustainability the norm. This could be an important element in transforming society from the current “buy and discard” behaviour – where things no longer have time to wear out before becoming waste – to more sustainable ones.

On the home front, the Government decided on another important change: from 2024, the municipalities will take over responsibility for the collection of packaging, and by 2027 everyone will have access to kerbside collection for these waste fractions. We know from experience that better service leads to better waste sorting – this increases Sweden's chances of reaching the EU's ambitious target of 65 percent of municipal waste being recycled by 2035.

75 YEARS OF EXPERIENCE

For Avfall Sverige, 2022 was also an important year for another reason – the organisation celebrated its 75th anniversary. We have been bringing municipalities together to jointly develop waste management since 1947. A look back through our history shows how much we can achieve by collaborating, educating, influencing and spreading good examples. The municipalities have been and are an engine of development and contribute greatly to innovations in the industry.

Our success can be seen, among other things, by the attention we have received from the UN. In 2022, the United Nations Development Programme (UNDP) and Avfall Sverige signed a Memorandum of Understanding regarding the mission to support the development of sustainable waste management and waste prevention.

You can read more about how Swedish waste management works in practice on the following pages. We hope it will provide both insight and inspiration.

July 2023



Tony Clark
CEO of 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 Code¹, waste is any matter or object that the bearer disposes of, intends to dispose of, or is obliged to dispose of.

There are different methods for treating waste²:

- 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 another fuel. 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 recovery 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 waste³ within the municipality is transported and recycled 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, etc⁴. 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 management⁵. 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 municipal 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
- municipalities
- 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 61 percent of the country's municipalities, the collection of food and residual waste is primarily carried out by private contractors. 36 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 2022



Percentage of municipalities

Solely private contractors.....	61.4%
Solely in-house.....	36.2%
Combination of in-house and contractors	2.4%

Waste management organisation 2022



Breakdown of responsible organisation	Municipalities No.	Percentage
Municipal self-administration.....	104	36%
Municipal association.....	54	19%
Joint board.....	7	2%
Municipal enterprise, wholly-owned	55	19%
Municipal enterprise, partially-owned .70	70	24%

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.



Photo: Bodil Johansson for VA SYD

Waste volumes

The volumes of collected and treated household waste⁶ from households and businesses amounted to 4.7 million tonnes in 2022. For the population as a whole, every Swede generated 449 kg of household waste, which is a five percent decrease compared to 2021.

In 2022, 28 percent, 1.3 million tonnes, went to material recycling, including the recycling of construction material. This corresponds to 123 kg per person and is a five percent decrease compared to 2021. 729,310 tonnes, 16 percent, were sent to biological treatment. This corresponds to 69 kg per person, which is a three percent decrease compared to 2021.

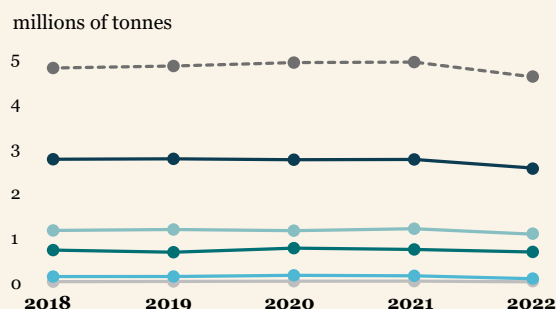
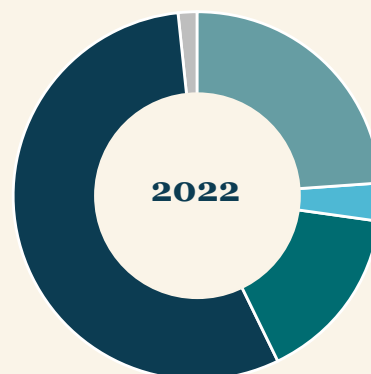
Energy recovery decreased by 5 percent compared to 2021, amounting to 2.6 tonnes, or 249 kg per person. Energy recovery accounts for 55 percent of treatment. Landfill decreased by 6 percent to 76 thousand tonnes, which corresponds to 7 kg per person. Landfill accounts for 1.6 percent of the total amount of the waste managed.

In 2022, almost 1.6 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 468,000 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, 1.7 million tonnes. This is a decrease of 8 percent compared to 2021. On average, 40 percent of the bulky waste went to material recycling, including biological treatment of garden waste, such as scrap metal, hard 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 695,000 tonnes in 2022, a decrease of 7 percent compared to 2021. This figure does not include packaging waste from businesses, unless it is disposed of at recycling stations.

Waste trends 2018–2022



- 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, §§ 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

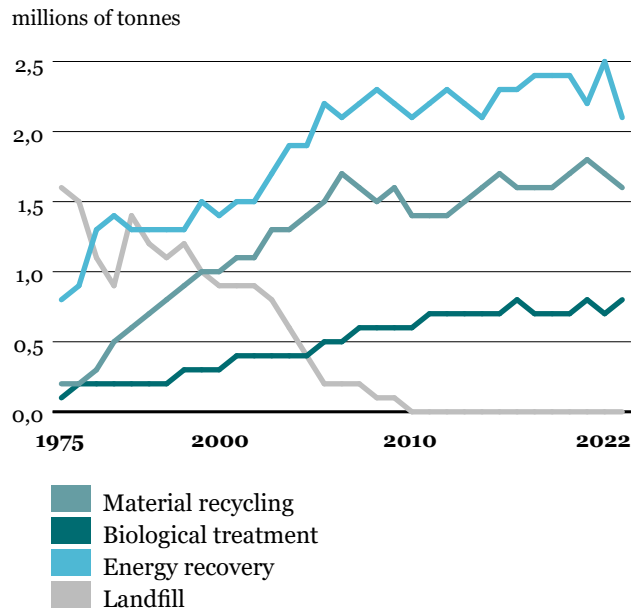
The Swedish Environmental Protection Agency compiles annual data on municipal waste. As of 2020, all EU Member States must report municipal waste based on a common definition. According to EU regulation, statistics on municipal waste are independent of whether public or private actors are responsible 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, 4.5 million tonnes of municipal waste were generated in Sweden in 2020, corresponding to 431 kg per person⁷. 2.8 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 (3.8 million tonnes), but also arises from businesses (0.7 million tonnes), food waste from restaurants and residual waste and packaging from shops. The definition of municipal waste does not include construction and demolition waste, either from households or businesses. However, Avfall Sverige's statistics include construction and demolition waste from households that does not arise from professional activities. Municipal waste also includes waste from grounds and street maintenance (excluding sand, stone, clay and dust) and park maintenance, which is not included in Avfall Sverige's statistics. The Swedish Environmental Protection Agency's statistics on municipal waste are to some extent under-reported pending the development of new procedures for statistical reporting from more organisations.

Throughout the EU, the volume of municipal waste is 530 kg per person based on the entire population. 50 percent was treated through material recycling, including biological treatment. 27 percent went to energy recovery and 23 percent was sent to landfill within the EU⁸.

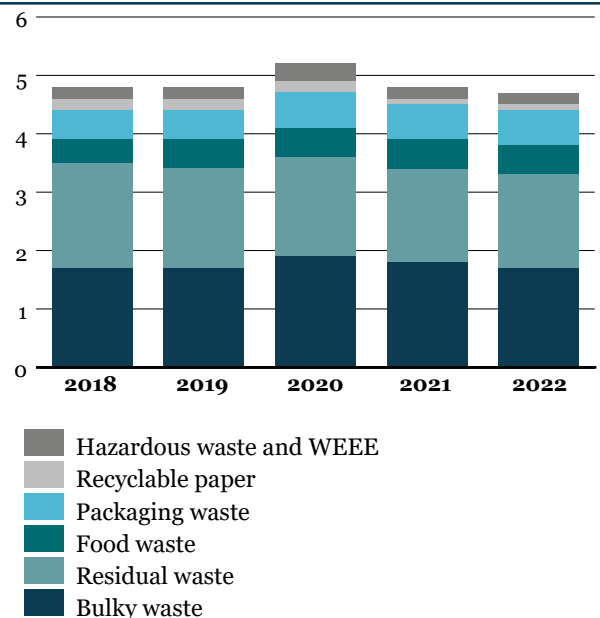
We use the term household waste to refer to the waste generated by households and businesses that falls under municipal waste responsibility pursuant to Chapter 15, § 20 of the Swedish Environmental Code. Compared with the concept of municipal waste, construction and demolition waste from households 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 1975–2022



Data on energy recovery, biological treatment and landfill come from the plant section of Avfall Web. Material recycling comes from the municipal part of Avfall Web and also includes construction materials and household-like packaging from businesses.

Volume of household waste collected 2018–2022



⁷<https://www.naturvardsverket.se/49d450/globalassets/amnen/avfall/statistikblad-hushallssektorn.pdf>
⁸All EU statistics are available at <http://ec-europa.eu/eurostat>

Treated volumes of household waste 2018–2022 (tonnes)

Tonnes	2018	2019	2020	2021	2022
Material recycling	1,167,770	1,165,150	1,227,310	1,198,780	1,136,910
Recycling of construction material	149,680	146,790	172,990	162,310	160,430
Biological treatment*	682,100	718,690	757,510	753,280	729,310
Energy recovery	2,792,620	2,750,430	2,782,720	2,763,640	2,616,450
Landfill	82,640	85,390	93,900	81,050	76,390
Total volume treated	4,874,810	4,866,450	5,034,430	4,959,060	4,719,490
kg/person	2018	2019	2020	2021	2022
Material recycling	114	113	118	115	108
Recycling of construction material	15	14	17	16	15
Biological treatment*	67	70	73	72	69
Energy recovery	273	266	268	264	249
Landfill	8	8	9	8	7
Total volume treated	477	471	485	474	449
Proportion, %	2018	2019	2020	2021	2022
Material recycling	24.0%	23.9%	24.4%	24.2%	24.1%
Recycling of construction material	3.1%	3.0%	3.4%	3.3%	3.4%
Biological treatment*	14.0%	14.8%	15.0%	15.2%	15.5%
Energy recovery	57.3%	56.5%	55.3%	55.7%	55.4%
Landfill	1.7%	1.8%	1.9%	1.6%	1.6%
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 2018–2022

Tonnes	2018	2019	2020	2021	2022
Bulky waste	1,685,670	1,730,570	1,909,360	1,849,660	1,717,870
Residual waste	1,824,510	1,744,800	1,669,090	1,638,050	1,595,590
Food waste*	430,650	454,410	463,010	482,200	467,860
Packaging waste	487,000	511,070	560,730	596,370	567,790
Recyclable paper	217,970	189,380	168,400	148,950	127,420
Hazardous waste and WEEE	229,000	236,220	263,840	243,830	242,960
Total volume collected	4,874,800	4,866,450	5,034,430	4,959,060	4,719,490
kg/person	2018	2019	2020	2021	2022
Bulky waste	165	168	184	177	163
Residual waste	178	169	161	157	152
Food waste*	42	44	45	46	44
Packaging waste	48	49	54	57	54
Recyclable paper	21	18	16	14	12
Hazardous waste and WEEE	22	23	25	23	23
Total volume collected	477	471	485	474	449
Proportion, %	2018	2019	2020	2021	2022
Bulky waste	34.6%	35.6%	37.9%	37.3%	36.4%
Residual waste	37.4%	35.9%	33.2%	33.0%	33.8%
Food waste*	8.8%	9.3%	9.2%	9.7%	9.9%
Packaging waste	10.0%	10.5%	11.1%	12.0%	12.0%
Recyclable paper	4.5%	3.9%	3.3%	3.0%	2.7%
Hazardous waste and WEEE	4.7%	4.9%	5.2%	4.9%	5.1%
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.

The term household waste 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. There are some differences compared to the concept of municipal waste; see the fact box on page 8.

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

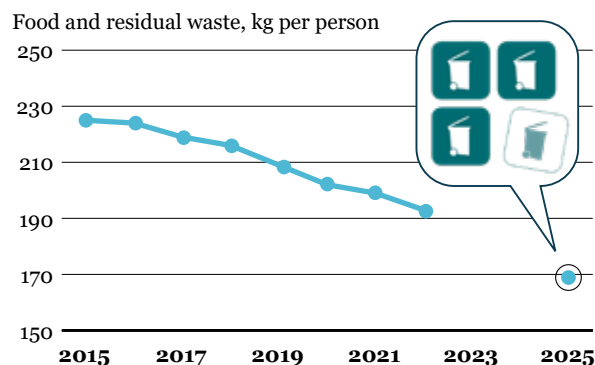
Avfall Sverige has set a goal: to reduce the total volume of food and residual waste by at least 25 percent per person (compared to 2015) by the year 2025 – our 25/25 goal. The purpose of the goal is to increase our pace as we climb up the waste hierarchy. The goal is voluntary for all municipalities to take on. Just under 100 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 2022, the volume of food and residual waste decreased by 14 percent (32 kg per person) to 193 kg.

TOOLS FOR PREVENTION

Avfall Sverige is continuously striving to develop aids and support – tools – to help municipalities in their efforts to prevent waste. 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 tested, and yielded results in terms of reduced waste volumes and costs, as well as a better working environment and better organisation. The working method is described in an updated handbook⁹ 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 guide¹⁰.

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

Follow-up of 25/25 goal



material called Öka takten uppför trappan [Increasing the pace up the ladder]¹¹. 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 report¹², 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 guide¹³ contains many tips and support. Avfall Sverige has several reports on reducing household waste, including a compilation of more than 60 proposals for measures¹⁴ and a report based on proposals for measures based on research¹⁵.

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 sätt att minska ditt avfall" [10 ways to reduce your waste]. 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.

⁹ Handbook on resource-smart material use in the municipality – method and inspiration for waste prevention] (2023)

¹⁰ Measurement and follow-up of waste prevention in businesses

¹¹ Avfall Sverige Report 2021:14 Increasing the pace up the ladder, Guide and Report 2021:13 Good examples

¹² Avfall Sverige Report 2019:25 Waste prevention and reuse in municipal waste plans

¹³ <https://www.naturvardsverket.se/vagledning-och-stod/avfall/informera-hushall-om-avfallsforebyggande-atgarder/>

¹⁴ Avfall Sveriges Report 2023:03 Municipal measures to reduce household waste – and facts on prevention

¹⁵ Avfall Sveriges Report 2023:12 Reducing household waste – research-based strategies and measures for the municipality as an actor

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 events¹⁶. The guide describes a deposit system with reusable materials as an alternative to single-use plastic.

REUSE

The concept of reuse is defined in the Swedish Environmental Code, but in short 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, about 70 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 activities¹⁷.

To facilitate the prevention and reuse work of the municipalities, Avfall Sverige has published a guide that explains the legal requirements¹⁸. 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 reuse¹⁹ and a guide on which construction materials and products are suitable for reuse²⁰.

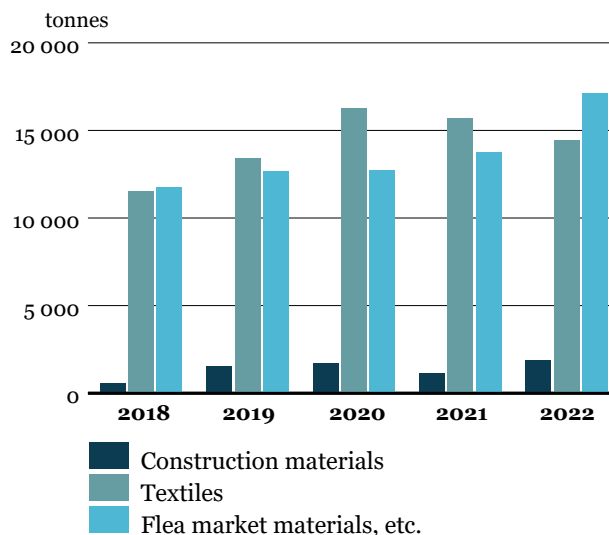


+210%

since 2014

Collection of materials and textiles for reuse amounted to 33,420 tonnes in 2022.

Materials collected for reuse 2018–2022



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.

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 – "Översta steget" [Top step] 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)
- 2023:13 Case study: Reducing the volume of paper advertising to the municipality (incl. calculation model)

¹⁶ Avfall Sverige Report 2021:03 Guide for events without single-use products

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



2,023,930 tonnes

193 kg per person

The per-person volume of food and residual waste collected decreased by 3 percent in 2022. *Home-composted food waste is not included.*

The volume of food waste collected decreased by 3 percent to 428,340 tonnes, amounting to 41 kg/ person. In 2022, 267 of the country's 290 municipalities had separate collection of source-separated food waste. Just under 40,000 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. From 2024, it will be mandatory for food waste to be collected separately from households and businesses. This requirement is linked to the EU Waste Framework Directive.

Residual waste from single-family houses is generally collected in 190 litre bins that are emptied every fortnight. There are also a number of different bin sizes emptied at different intervals. Waste from apartment blocks is usually collected on a weekly basis.

To achieve higher levels of material recycling of packaging, the intention is to change the current system of collection, with an emphasis on recycling stations, to a system based mainly on kerbside collection. Kerbside collection will be expanded and become the primary collection method in accordance with the Government's decision of July 2022. The Government wants to increase recycling by shifting the responsibility for collecting packaging to the municipalities, while maintaining the producers' responsibility for material recycling. Under producer responsibility, the producers will also bear the costs for collection and recycling. According to the Government's decision, operational responsibility will be transferred to the municipalities on 1 January 2024. By 1 January 2027 at the latest, all households will have plastic, paper, glass and metal collection in the vicinity of their homes. There shall also be provisions for bulky paper and plastic packaging to be deposited at easily-accessible collection points.

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

60 PERCENT INCORRECTLY SORTED

Over 60 percent of the contents of household rubbish bags could be recycled²². This can be food waste, packaging and recyclable paper. Half a percent of the contents of the rubbish bag consists of hazardous waste, such as batteries and WEEE.

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. On average, biogas represents 39 percent of the volumes consumed. 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.

Hybrid electric vehicles and electric vehicles have great potential for the waste industry and are being used in various places. In 2022, electricity accounted for 0.3 percent of total consumption. 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.

²¹ Municipal waste in figures – municipal and county statistics 2021

²² Avfall Sverige Report 2016:28 What do households put in their waste bins?

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. There is also limited kerbside collection of paper, plastic and metal packaging from households via TMR's pick-up service.

RECYCLING CENTRES

At the manned 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, burglaries²³ 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 deposit their waste outside of regular opening hours. 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.

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 mobile facilities in the form of one or more trucks forming a train. 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

1,717,870 tonnes



In 2022, households disposed of 1,717,870 tonnes of bulky waste, most of it at municipal recycling centres. This was a decrease of 7.1% compared to 2021.

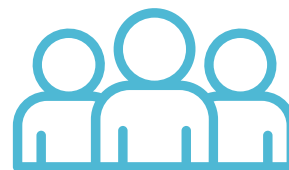


590

There are 590 recycling centres throughout the country which combined receive about 28 million visits annually.



163 kg per person



The volume of bulky waste corresponds to 163 kg per person.

²³Avfall Sverige Report 2017:11 Safety and security at recycling centres

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 activities.

RECYCLING STATIONS

The producer system through Förpackningsinsamlingen, FTI, has approximately 5,000 unmanned recycling stations for the receipt of packaging that are intended to cover the entire country. Collection systems should be based on consultation between the producers and municipalities.

COLLECTING COOKING OIL

There are municipalities that collect source-separated cooking oil, mainly to reduce operating problems and blockages in drainage systems. Cooking oil can be recycled or reused. There are different methods for collecting and treating the oil²⁴. One system is that households pour the cooking oil into a container with a tight seal and then hand it in at a recycling centre. 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 on 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?

Fuel for the collection of food and residual waste 2022



Biogas.....	39%
HVO/Other renewable	49%
Diesel, fossil proportion	10%
Natural gas.....	2%

The diagram shows the distribution of fuel consumed in the collection of food and residual waste, based on total volumes. The information is based on the data registered in Avfall Web by 187 municipalities. These municipalities may have more renewable fuels than Sweden as a whole.

Most common collection systems for single-family houses



Two separate bins
(one for food waste and one for residual waste)
54%



Only one bin
9%



Multi-compartment bins
(Mainly 4-compartment)
24%



Different coloured bags for optical sorting
(usually food waste+residual waste, but there is also residual waste+food waste+newspapers/packaging waste)
13%

²⁴Avfall Sverige Report 2015:07 Cooking oil sorting and treatment – good examples from municipalities and housing companies

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 plants²⁵ 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 needed²⁶. The treatment charge for sludge from sludge separators averaged SEK 172 per tonne, excluding VAT, in 2022. 45 percent of the sludge from private sewers was used on agricultural land, and 18 percent was used to cap landfills. The trend is that sludge for landfill capping is decreasing, while use on agricultural land is increasing.

179 municipalities have reported that they handle 50,510 latrine waste collections per year, in total 874 tonnes of latrine waste. The scope varies from one latrine waste collection per year in certain municipalities to up to 5,000 collections in municipalities with many second homes. The number of latrine waste collections has decreased by 34 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 traps²⁷ and micro treatment plants²⁸, 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 280 tonnes of phosphorus filter material was collected in 2022.

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. Just over half of the 207 municipalities that provided information in Avfall Web run entirely on renewable fuels, such as HVO and biogas. One-fourth 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. 73 percent of the municipalities use full drainage, 7 percent use mobile dewatering, 15 percent use partial drainage with two-compartment vehicle, and 3 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 process²⁹.

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 criteria³⁰.

25 Revaq certification applies to sludge from treatment plants; see svensktvatten.se

26 Avfall Sverige Report 2016:20 Dewatering of sludge from small wastewater treatment plants – quality and disposal

27 Avfall Sverige Guide #19 Phosphorous filters – handling and replacement

28 Avfall Sverige Report U 2013:14 Micro treatment plants in private sewers

29 Avfall Sverige Guide #13: Sustainable occupational health and safety during sludge collection from private sewers

30 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 “

GREASE SEPARATORS AND COMBINATION SYSTEMS

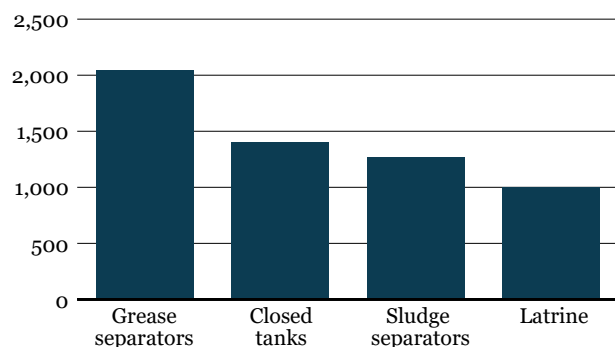
Grease generated in households and restaurants is categorised as municipal waste³¹. Approximately 180,120 tonnes of sludge from 17,860 grease separators were treated by the municipalities in 2022. On average, each system is emptied 3.3 times per year, but there is great variation from once a year to twelve times a year in some municipalities. 85 percent of the grease separator sludge undergoes anaerobic digestion, primarily at municipal wastewater treatment plants. On average, the treatment charge amounted to SEK 411 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 municipalities³².

READ MORE IN AVFALL SVERIGE'S REPORTS

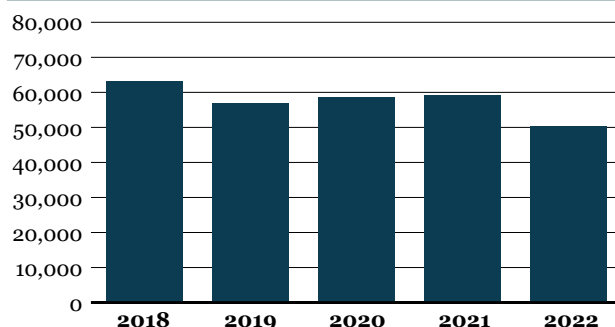
- 2016:07 Sustainable eco-cycle of small sewers
- 2019:02 Sludge collection with two-compartment vehicle. Smaller amount to transport and treat – better for the environment!
- 2020:16 A comparative study of two sludge collection techniques – full drainage and mobile dewatering with polymers
- 2022:16 Partial drainage of sludge separators with one-compartment vehicle

Collection charges 2022

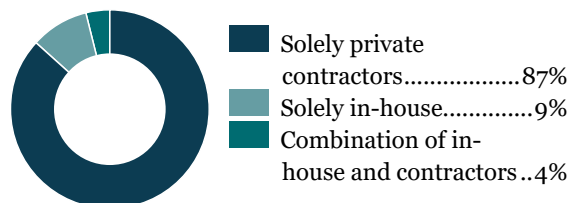
SEK per drainage, incl. VAT



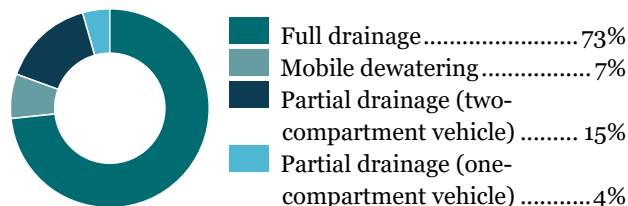
Number of latrine waste collections 2018–2022



Sludge collection service providers 2022



Sludge collection technique 2022



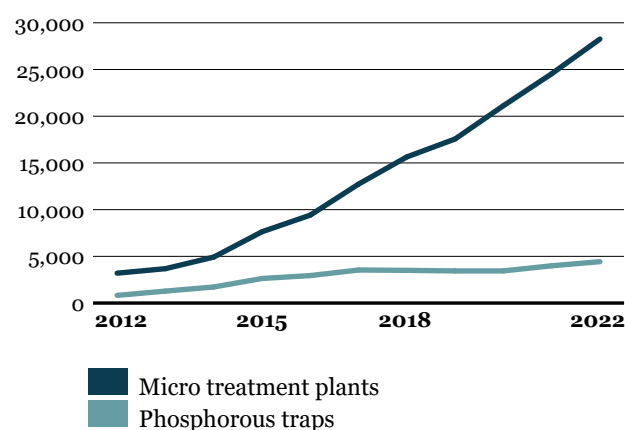
Disposal of sludge 2022



Number of individual wastewater treatment plants 2022

Total number of private sewers	693,580
Sludge separators, number of plants	549,050
Sludge separators, number of collections	560,230
Closed tanks, number of plants	93,590
Closed tanks, number of collections	168,550

Number of micro treatment plants and phosphorous traps 2012–2022



³¹ Avfall Sverige Guide #25 Meaning of the term municipal waste

³² Avfall Sverige Report 2018:35 Grease separators and combination systems with separators for food waste and grease

Hazardous waste

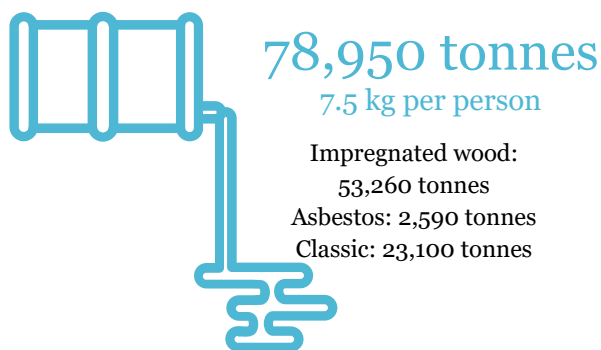
78,950 tonnes of hazardous waste³³ were collected from households in 2022 (equivalent to more than 7.5 kg per inhabitant), an increase of 17 percent compared to 2021. This volume includes 53,260 tonnes of impregnated wood and 2,590 tonnes of asbestos, a decrease of 20 percent and 7 percent, respectively compared to 2021. Hazardous waste in the form of paint, chemicals and oil waste amounted to 23,100 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 2020³⁴. 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 “Vart går det farliga avfallet” [Where does hazardous waste go?] from 2017 shows that about 343,000 tonnes were exported to European treatment plants.

Volume of hazardous waste collected



COLLECTION SYSTEMS

The majority of hazardous waste from households is collected at municipal recycling centres, but four out of five municipalities currently 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 rooms³⁵. 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.

Volume of hazardous waste collected 2000–2022



³³ Hazardous waste is waste that Annex 4 of the Swedish Waste Ordinance describes with a waste code marked with an asterisk (*).

³⁴ Swedish Environmental Protection Agency Report Waste in Sweden 2020

³⁵ 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 products³⁶ 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.

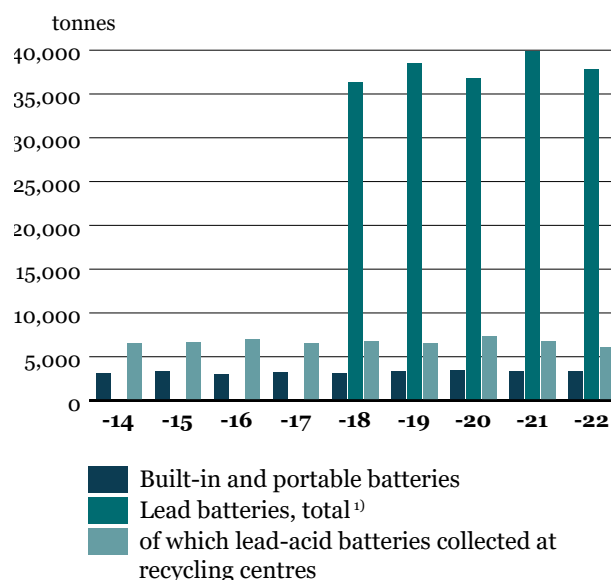
Avfall Sverige and El-Kretsen collaborate with several municipalities on different projects to develop these collection systems. The collection of WEEE from households takes place mainly at the 590 municipal recycling centres, but a majority of the municipalities have several different collection systems for WEEE, both kerbside and consumer-oriented³⁷.

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.

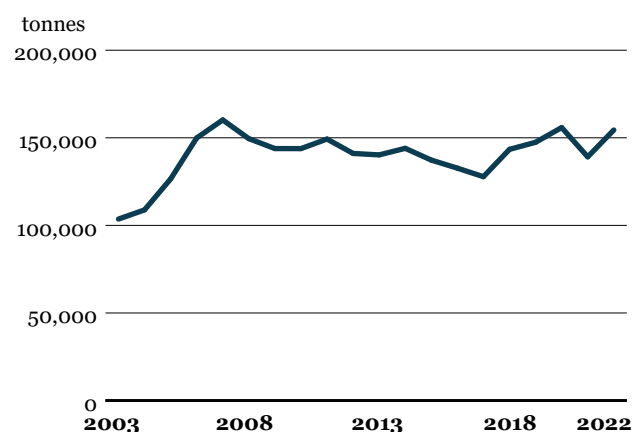
There are two approved national collection systems for WEEE – El-Kretsen and Recipo.

Volume of collected batteries 2014–2022



1) Source: BlybatterRetur. Collection of lead batteries in Sweden refers to the volume of batteries collected for recycling in Sweden. These have been sent to smelters in Sweden and abroad.

WEEE collected for material recycling 2003–2022



Source: El-Kretsen and Recipo

³⁶ See the definition of electrical and electronic waste in Ordinance (2014:1075) on Producer Responsibility for Electrical and Electronic Equipment

³⁷ Avfall Sverige Report 2022:02 Fastighets- och konsumentnära insamling av farligt avfall [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.

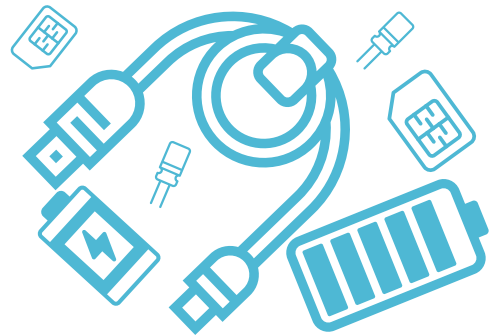
Much can be recovered once the hazardous substances have been removed. Plastic cases are incinerated in energy recovery plants, and metals are sent to smelting plants for material recycling. Recovered copper, aluminium and iron are used as raw materials in new products. Computers, mobile phones and other 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 heavyweight³⁸



154,460 tonnes



154,460 tonnes of WEEE, excluding batteries, were collected in 2022. This is an increase of 11 percent compared to 2021.

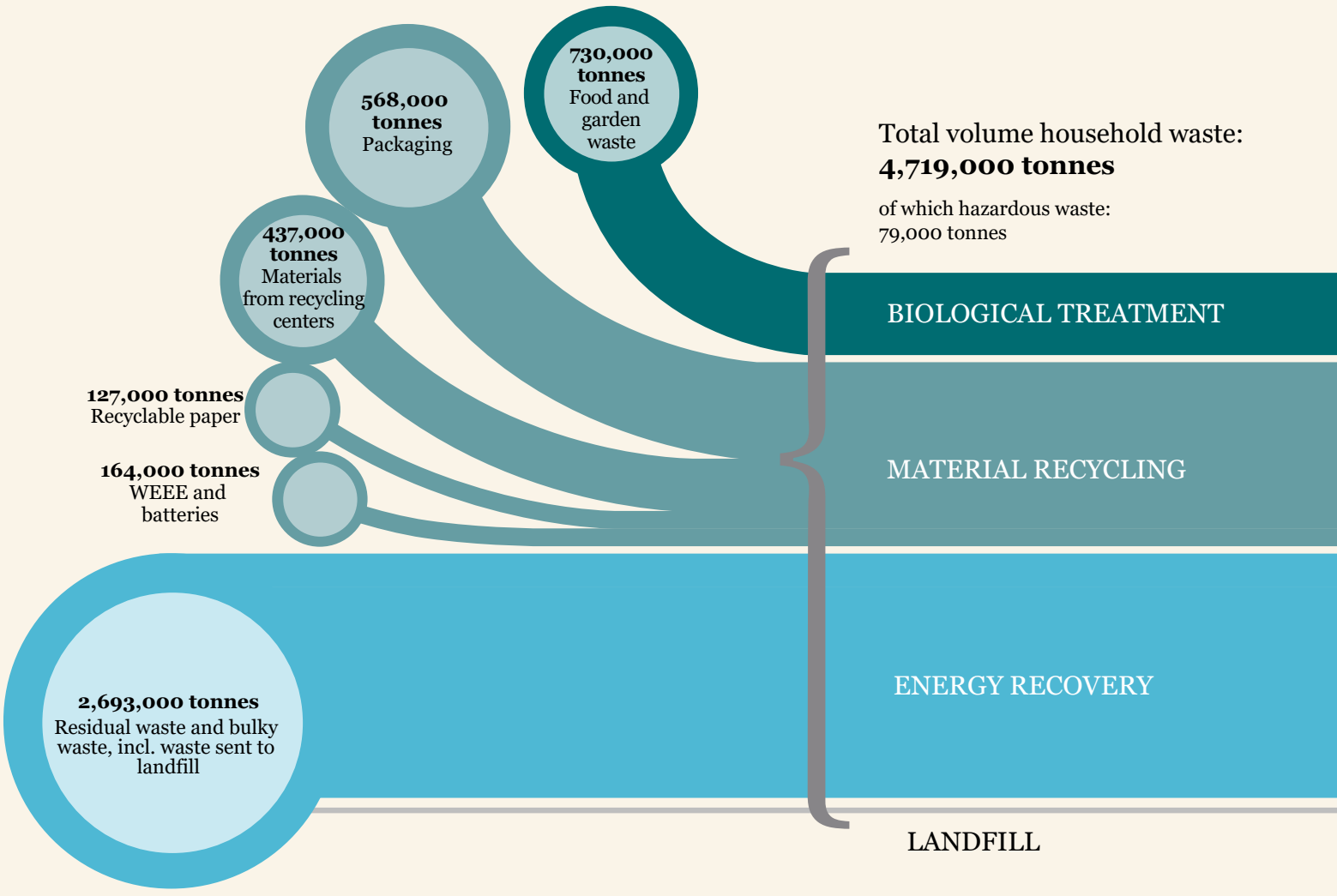


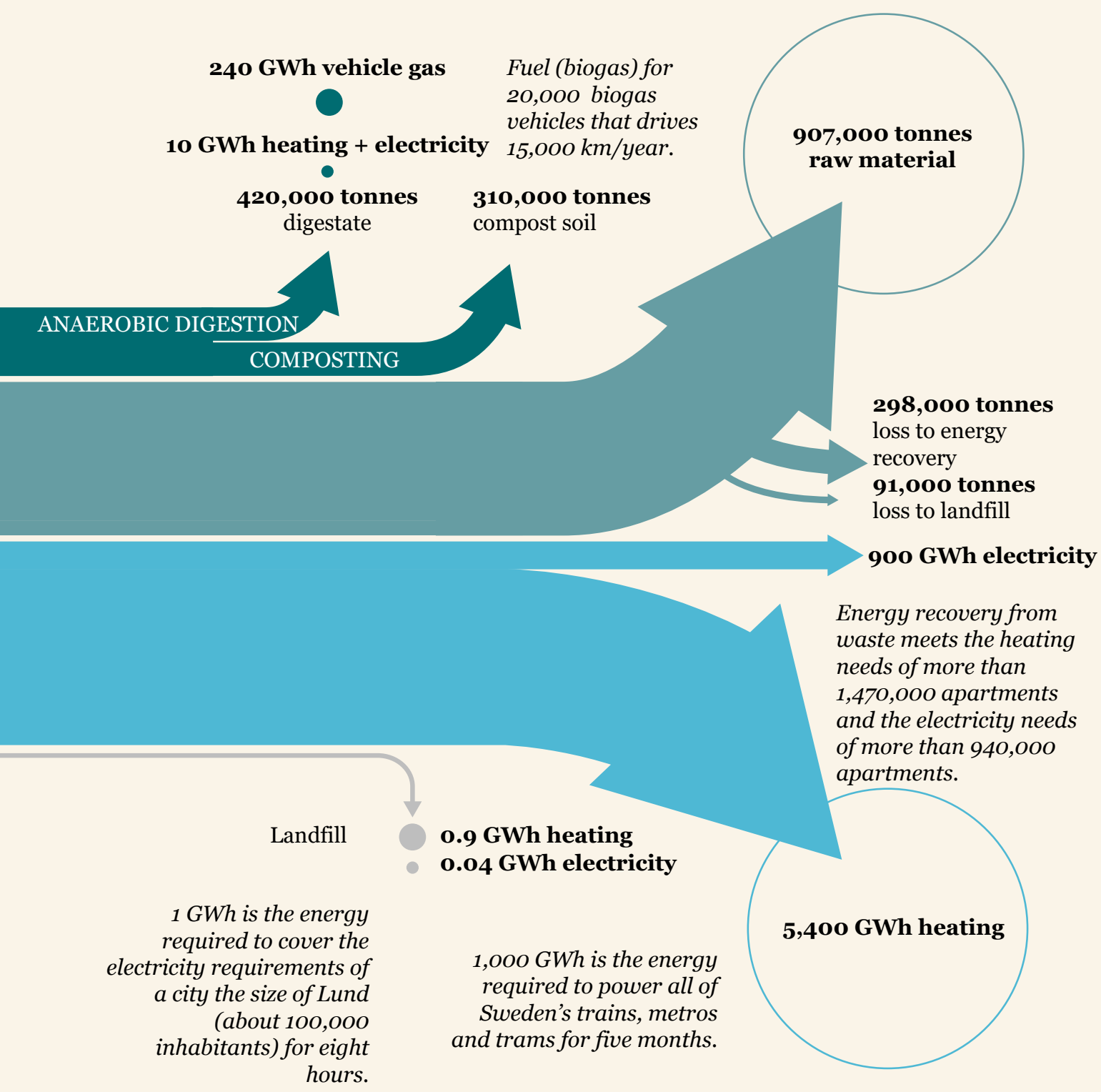
The volume of WEEE corresponds to

14.7 kg per person

³⁸<https://www.avfallsverige.se/fakta-statistik/forebyggande/osynligt-avfall/>

Swedish household waste 2022





Material recycling

907,000 tonnes
raw material

298,000 tonnes
loss to energy
recovery
91,000 tonnes
loss to landfill

1,136,910 tonnes, 24 percent, of household waste went to material recycling in 2022. This corresponds to 108 kg per person, a five percent decrease compared to 2021. In addition, 160,430 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 recycled³⁹. 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 2020, just under 40 percent of municipal waste was actually recycled or prepared for reuse⁴⁰. In the case of packaging, material recycling amounted to 62 percent in

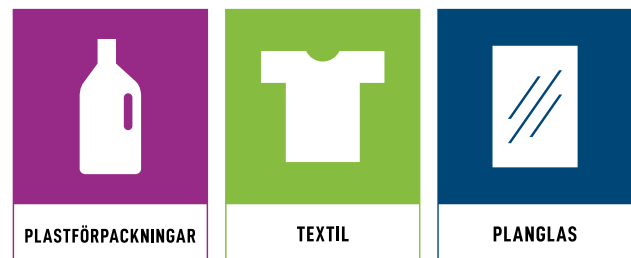
2021, so there is still some way to go to reach the target of 65 percent by 2025⁴¹. For recyclable paper, the recycling target is 90 percent⁴². Follow-up of the target has not yet been carried out.

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 through the company Förpackningsinsamlingen – FTI. A small number of producers are organised through the company TMR. As of 1 January 2022, producer responsibility for recyclable paper has been lifted, and the



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

³⁹ Read more about the EU Waste Framework Directive: <https://eur-lex.europa.eu/legalcontent/SV/TXT/PDF/?uri=OJ:L:2018:150:FULL&from=EN>

⁴⁰ <https://www.naturvardsverket.se/49d45f/globalassets/amnen/avfall/statistikblad-kommunalt-avfall.pdf>

⁴¹ Swedish Environmental Protection Agency Report Sweden's recycling of packaging. Follow-up of producer responsibility for packaging 2021.

⁴² Cf Chapter 4, § 7 b of the Swedish Waste Ordinance (2020:614), as amended on 1 January 2022.

municipalities are now responsible for the collection and recycling of recyclable paper.

Household packaging is mainly collected through unmanned recycling stations owned by the producers and through kerbside collection. 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.

A growing number of municipalities have implemented kerbside collection of packaging and recyclable paper, together with 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. Avfall Sverige has compared different systems for kerbside collection in an urban environment⁴³. The report presents various systems for kerbside collection of packaging, food and residual waste with a particular focus on the urban environment and the special conditions that exist there, such as lack of space and high development pressure. Sources of inspiration and experiences for apartment blocks are presented with good examples from different municipalities and housing companies.

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.

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. From 1 November 2023, all producers must be a member of a producer responsibility organisation approved by the Swedish Environmental Protection Agency. FTI will then be phased out and Näringslivets producentansvar, NPA, will take over the responsibility. In addition to NPA, TMR has also applied to become a producer responsibility organisation ahead of January 2024, when responsibility for the collection of packaging is transferred to the municipalities.

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.

Products for reuse collected at recycling centres are increasing, such as 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 (considered hazardous waste). 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 biochar⁴⁴. The method has attracted great national and international interest.

⁴³ Avfall Sverige Report 2018:11 Kerbside collection in an urban environment

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.

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 materials⁴⁵.

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 positions⁴⁶ 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 new 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 stage⁴⁷. 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 inquiry⁴⁸ 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 hard plastic. According to Avfall Web, 10,340 tonnes of hard plastic were collected for recycling in 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, a new, modern sorting plant for plastic packaging was inaugurated in Motala, enabling expanded sorting of plastic. The plant is being expanded to enable the sorting of additional plastics, making it the world's largest plastic sorting plant. The plant will be completed in 2023.

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

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

45 Report No. C245 IVL Material recycling of plastic waste from recycling centres

46 <https://www.avfallsverige.se/om-oss/vad-vi-tycker/>

47 Avfall Sverige Report 2022:23 Unity – Is it possible to replace all current plastic variants with a smaller number?

48 SOU 2018:84 It's possible if we want it bad enough. Suggestions for sustainable plastic use.

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 proposal is out for consultation until 25 August 2023.

The focus and demand for textile recycling is large globally, but only a limited proportion of textiles are capable 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 2022

	tonnes	kg/person
Recyclable paper	127,420	12.1
Paper packaging	204,390	19.4
Metal packaging	20,990	2.0
Plastic packaging	104,780	10.0
Glass packaging	237,630	22.6
Total packaging	567,790	54.0

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

Collected household waste¹⁾ for material recycling 2018–2022, tonnes

	2018	2019	2020	2021	2022
Recyclable paper	217,970	189,380	168,400	148,950	127,420
Packaging made from cardboard, metal, plastic and glass ²⁾	487,000	511,070	560,730	596,370	567,790
WEEE including cooling units	143,410	147,430	155,840	139,130	154,450
Portable batteries (incl. built-in)	3,170	3,380	3,460	3,550	3,410
Lead batteries ³⁾	6,820	6,620	7,310	6,810	6,160
Oil waste	1,770	950	1,000	1,000	950
Water and solution-based paint	4,450	3,710	3,770	3,820	3,580
Other hazardous waste for material recycling	4,370	1,030	1,260	1,400	1,170
Scrap metal	161,230	160,790	176,550	158,930	139,370
Plaster waste	24,270	24,960	27,330	28,830	27,960
Flat glass	1,720	2,920	2,900	4,040	4,760
Hard plastic, not packaging	12,600	12,200	14,540	14,590	10,340
Corrugated board from recycling centres	53,620	53,470	56,340	57,570	52,190
Textile waste	3,150	5,340	3,490	3,300	4,870
Other material submitted for recycling, incl. tyres	42,220	41,900	44,160	29,820	31,800
Deep fryer oil	0	0	230	670	690
Total material recycling	1,167,770	1,165,150	1,227,310	1,198,780	1,136,910
Recycling of construction material	145,770	146,790	172,990	162,310	160,430
Material recycling, incl. construction material	1,313,540	1,311,940	1,400,300	1,361,090	1,297,340

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

240 GWh vehicle gas

10 GWh heating + electricity

420,000 tonnes
digestate

310,000 ton
compost soil

ANAEROBIC DIGESTION

COMPOSTING

The biological treatment of food waste at Swedish anaerobic digestion and composting plants amounted to 459,100 tonnes in 2022. This corresponds to 44 kg per person. This is an increase of 3 percent compared to 2021.

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 1,145 Gwh, of which 90 percent was vehicle gas.

The amount of food waste treated in co-digestion plants decreased by 0.2 percent, while food waste treated in central composting plants fell by 17 percent. Food waste digested at wastewater treatment plants increased by 54 percent compared to 2021.

According to the Swedish Environmental Protection Agency's calculations⁴⁹, approximately 58 kg of food waste is produced per person annually in Swedish households. This equals 619,000 tonnes⁵⁰. It is estimated that 26 percent is edible food waste, i.e. unnecessary food waste, while 74 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, 65,000 tonnes are generated by restaurants and hotels, 33,000 tonnes from public meals (catering, etc.) and 91,000 tonnes from grocery stores. This adds up to 77 kg per person, or 808,000 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 milestone, 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.

INCREASED COLLECTION OF SOURCE-SEPARATED FOOD WASTE

In 2022, municipal collection of source-separated food waste decreased by 3 percent compared to 2021, amounting to 428,340 tonnes. 92 percent of the municipalities, i.e. 267, 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 compiled a guide to help municipalities and businesses get started with the collection of source-separated food waste⁵¹.

Avfall Sverige has also created an overview of various collection systems for source-separated household food waste⁵². 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 phase⁵³. 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^{54,55}.



-3%

The collection of source-separated food waste decreased in 2022 compared to 2021.

⁴⁹Swedish Environmental Protection Agency's website <https://www.naturvardsverket.se/data-och-statistik/avfall/avfall-mat>

⁵⁰79 kg (825,000 tonnes) of food waste poured down the drain is included.

⁵¹Guide #2 Introduction of system for the collection of source-separated food waste; updated August 2020.

⁵²Avfall Sverige Report 2015:15 Food waste's journey from table to earth

⁵³Avfall Sverige Report 2015:17 Quality assurance of source-separated food waste

⁵⁴Avfall Sverige Report 2016:03 Collection of food waste in apartment blocks. Good examples from municipalities and public housing companies

⁵⁵Avfall 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, 23 percent use four-compartment bins and 14 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. Following upgrading, whereby carbon dioxide is removed, it 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. Just under 1.8 million tonnes of digestate were produced in 2022. 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 2022, 28 percent of the digestate produced was approved for use in organic production.

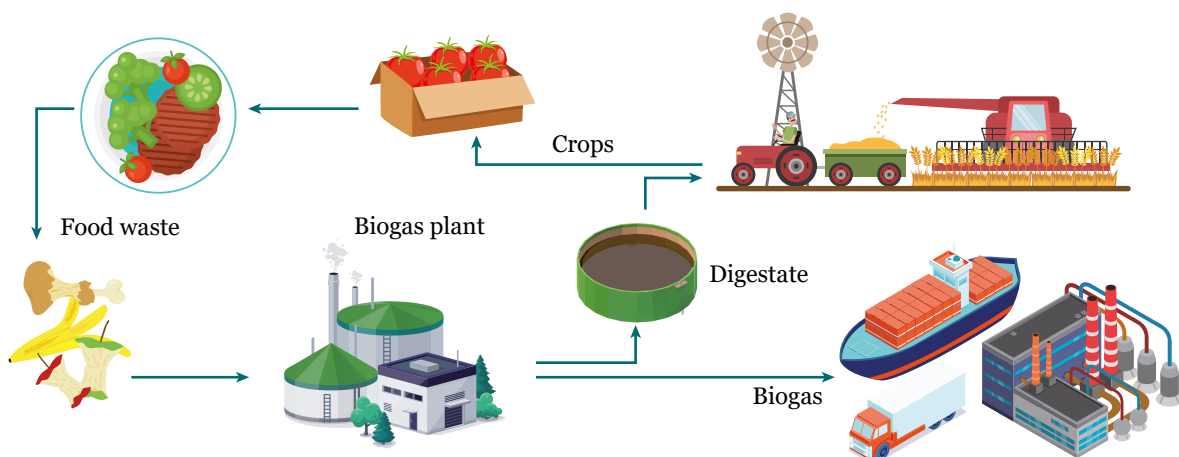
CERTIFIED RECYCLING

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 2022, 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.



Biological treatment of food waste at central plants 2018–2022 (tonnes)

	2018	2019	2020	2021	2022
Food waste to co-digestion plants	381,090	332,380	401,490	407,090	406,090
Food waste to central composting plants	15,620	9,580	8,530	8,370	6,970
Food waste that undergoes anaerobic digestion at wastewater treatment plants	47,460	46,600	39,070	29,950	46,040
Total central plants	444,170	388,560	449,090	445,410	459,100

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 drainage system via a food waste disposer.

Biological treatment through anaerobic digestion, total* 2018–2022

	2018	2019	2020	2021	2022
Volume of waste to anaerobic digestion (tonnes)	1,631,400	1,710,100	1,763,010	1,733,520	1,789,800
Resource economisation (tonnes)					
Digestate	1,737,110	1,678,740	1,823,620	1,737,160	1,818,480
Energy production (MWh)					
Vehicle gas	848,390	886,840	963,270	1,053,200	1,040,770
Electricity	4,610	5,380	5,700	2,110	3,400
Heating	38,240	43,340	48,120	58,160	49,940
Flaring	34,290	57,230	68,390	44,730	38,720
Other	24,900	20,330	21,810	16,370	12,510
Total (MWh)	950,430	1,013,120	1,107,290	1,174,570	1,145,340

Source: Avfall Web, Avfall Sverige.

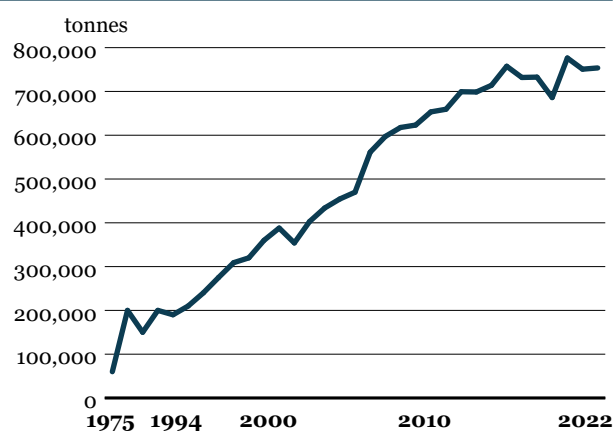
*) These volumes relate to the co-digestion plants that reported data to Avfall Web. This summary does not provide a complete picture of biological treatment through anaerobic digestion in Sweden.

Plants that compost food waste 2022

Municipality	Food waste (tonnes)
Luleå	3,430
Uppsala	70
Östersund	3,470
Total	6,970

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 1975–2022



Co-digestion plants 2022

Municipality	Total (tonnes)	of which food waste
Alvesta	55,260	3,320
Bjuv*	42,310	8,710
Borås*	23,660	17,110
Falkenberg*	86,100	34,110
Falköping	9,760	8,060
Gotland*	91,260	4,690
Gävle*	22,840	17,480
Helsingborg*	131,130	16,180
Huddinge*	73,610	51,400
Härnösand*	3,070	2,980
Höör	2,350	2,350
Jönköping*	23,180	21,110
Kalmar*	23,000	360
Kalmar*	88,290	2,870
Karlshamn	5,800	4,330
Karlskoga*	49,590	19,250
Katrineholm*	60,000	0
Kristianstad*	105,450	35,530
Laholm*	35,810	4,880
Lidköping*	99,700	0
Linköping*	105,200	50,600
Mariestad	81,600	0
Skellefteå	10,280	8,830
Skövde*	37,550	1,140
Sotenäs*	21,130	9,850
Sävsjö*	78,260	210
Trelleborg*	73,210	0
Upplands-Bro*	67,380	35,680
Uppsala*	47,140	28,190
Vårgårda*	80,300	90
Västerås*	24,670	16,780
Västerås*	83,500	0
Örebro*	47,410	0
Total	1,789,800	406,090

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 household 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

MINIMIZING METHANE EMISSIONS

Avfall Sverige and Svenskt Vatten are collaborating on a self-inspection system⁵⁶ 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 measure⁵⁷ emissions and actively strive to reduce them.

The methane issue has been made a high priority, and an action plan for reducing methane emissions from the waste sector with proposals for targets and measures is under development.

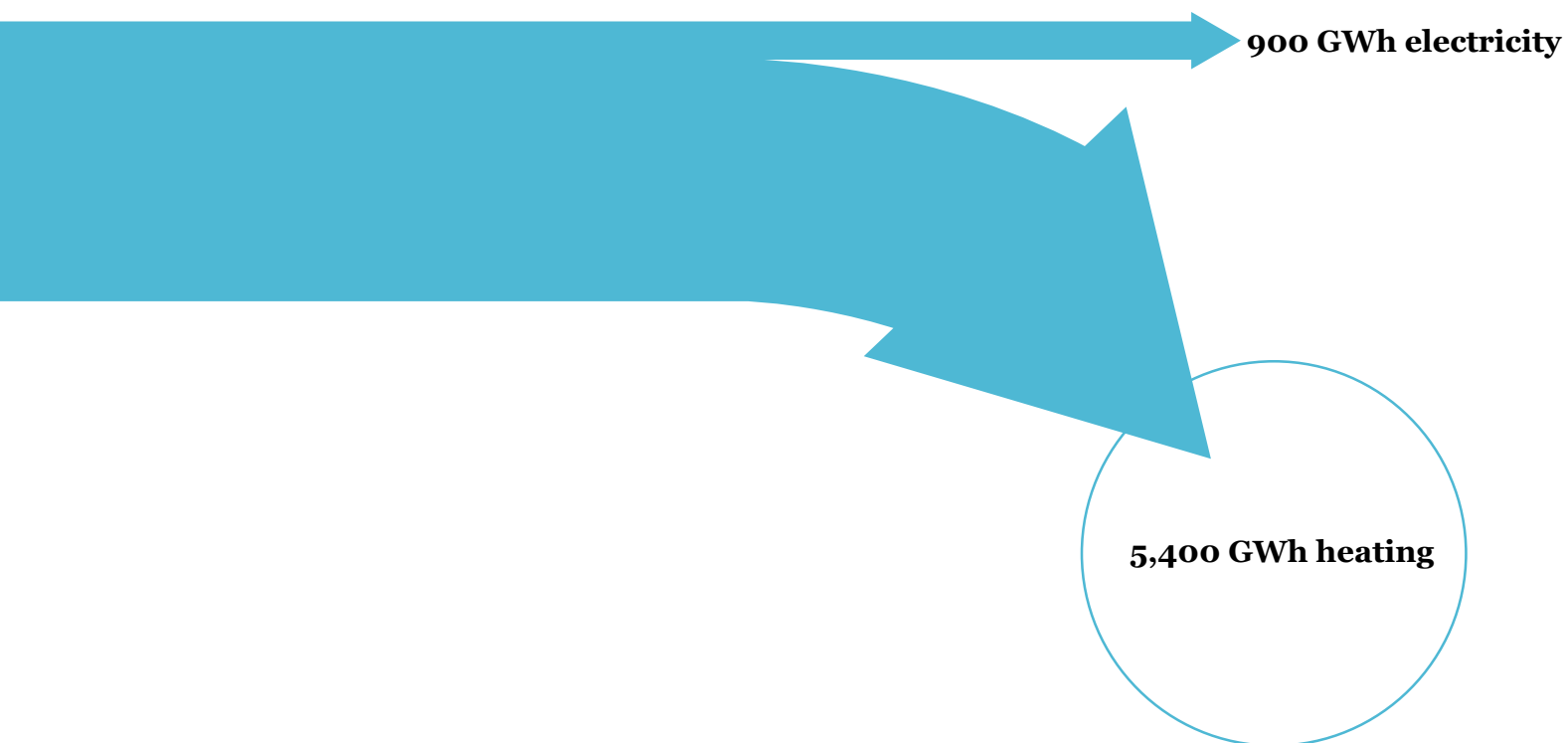
READ MORE IN AVFALL SVERIGE'S REPORTS

- Guide #15: Food waste collection – what applies under animal by-products legislation?
- 2018:31 The food waste recycling processes of the future
- 2018:33 Compilation of knowledge 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
- 2022:21 Compilation of data from methane measurements according to self-monitoring of methane emissions in 2016–2018 – and comparison with previous years
- 2022:24 Measures to reduce food waste in households

⁵⁶Self-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

⁵⁷Avfall Sverige Report 2016:17 Methane measurement handbook. Revised 2016

Energy recovery



In 2022, Swedish waste incineration plants received 6.8 million tonnes of waste for energy recovery. This is a decrease of 2 percent compared to 2021. 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 2022, 21 TWh of energy was recovered, of which 18 TWh was used for heating and 3 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 3.1 MWh per tonne.

The capacity for energy recovery in Sweden is greater than the domestic availability of combustible waste. In 2022, Swedish energy recovery plants therefore also treated 1.8 million tonnes of sorted waste from other European countries, 537,000 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 127 million tonnes of waste is still sent to landfill (2020)⁵⁸, 53 million tonnes

of which is municipal waste⁵⁹. This leads to methane emissions equivalent to more than 130 million tonnes of carbon dioxide⁶⁰. 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.

Incinerating plastic waste with fossil content leads to fossil carbon dioxide emissions. 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 study⁶¹.

In Sweden, there are 35 incineration plants for household waste, with energy recovery. Kils energi and Söderenergi do not take in household waste, but are members of Avfall Sverige and are included in the energy recovery statistics.

There is residue from combustion. Slag makes up about 15 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.

⁵⁸https://ec.europa.eu/eurostat/statistics-explained/index.php/Waste_management_indicators

⁵⁹https://ec.europa.eu/eurostat/statistics-explained/index.php/Municipal_waste_statistics#Municipal_waste_treatment

⁶⁰<https://www.eea.europa.eu/publications/annual-european-union-greenhouse-gas-1>

⁶¹Avfall Sverige Report 2021:09 Backcasting – how Sweden can achieve fossil-free energy recovery from waste incineration

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 example⁶². 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 method⁶³. Swedish plants fulfil the Energy Efficiency Criterion (R1 formula) by good margin⁶⁴. 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

- 2015:24 Quality assurance upon import of waste fuel
- 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
- 2018:09 Fire safety during storage of waste fuel
- 2018:13 Guide for classifying incineration residues with calculation methods
- 2018:28 How do we achieve fossil-free waste incineration? – A scenario analysis
- 2019:06 Waste incineration for future needs: scenario analysis and action plans
- 2019:14 Updated decision-making support for recycling granulated slag in specific asphalt-covered construction structures
- 2019:27 Fuel quality – current status and scenarios for composition of residual waste by 2025
- 2021:09 Backcasting – how Sweden can achieve fossil-free energy recovery from waste incineration
- 2021:18 PFAS in waste residuals from Swedish incineration plants
- 2022:05 Handbook for reducing plastic waste sent to energy recovery
- 2022:07 Chemical recycling for fossil-free energy recovery
- 2022:13 Socioeconomic analysis of energy recovery of waste in Sweden
- 2022:14 Development of a test method for granulated slag for hazard classification of ecotoxic properties (HP14)
- 2022:19 Pathways to less recyclable waste sent to energy recovery – broadened acceptance criteria and other initiatives
- 2022:22 Capacity study 2022 – energy recovery and residual waste volumes through 2027
- 2023:02 Pre-study on reducing plastic waste sent to energy recovery
- 2023:04 Bio-credits – business models for negative emissions from energy recovery

⁶² Avfall Sverige Report 2019:14 Updated decision-making support for recycling granulated slag in specific asphalt-covered construction structures

⁶³ EU Framework Directive on Waste (2008/98/EC) and the Swedish Waste Ordinance (2020:614)

⁶⁴ Read more about the Energy Efficiency Criterion (R1) in appendix 2 of the Swedish Waste Ordinance (2011:927)

Energy recovery plants 2022

Municipality	Plant	Processed waste (tonnes)		Energy production (MWh)	
		Total	of which household waste from Sweden	Heating	Electricity
Avesta	Källhagsverket	39,990	11,840	166,370	0
Boden	Bodens Värmeverk	140,590	68,870	355,100	62,440
Bollnäs	Säverstaverket	67,820	40,730	136,480	34,790
Borlänge	Fjärrvärmeverket, Bäckelund	82,220	50,000	234,110	35,230
Borås	Ryaverket	112,370	18,900	243,360	54,130
Eda	Åmotsfors Energi	66,710	14,560	158,980	20,270
Eksjö	Eksjö Energi AB	48,360	23,010	136,290	12,940
Finspång	FTV Värmeverket	24,720	1,150	67,450	0
Gothenburg	Sävenäs avfallskraftvärmeverk	541,930	216,750	1,500,980	210,050
Halmstad	Kristineheds avfallsvärmeverk	161,900	56,760	446,570	68,140
Helsingborg	Filbornaverket	210,000	65,000	450,000	119,000
Hässleholm	Beleverket i Hässleholm	51,380	25,200	117,500	5,320
Jönköping	Kraftvärmeverket Torsvik	149,880	33,240	417,660	107,460
Karlskoga	Karlskoga Kraftvärmeverk	92,710	37,790	148,900	24,910
Karlstad	Avfallsvärmeverket på Heden	42,190	42,190	132,750	0
Kil	Kils Avfallsförbränningsanläggning	15,050	0	44,800	0
Kiruna	Kiruna Värmeverk	40,580	3,980	113,060	11,420
Kumla*	Ekokem Förbränning	148,310	5,400	272,520	30,450
Köping	Norsa avfallsförbränningsanläggning	23,620	15,510	62,960	0
Lidköping	PC Filen	107,200	18,860	350,230	29,250
Linköping	Gärstadverket	565,920	90,460	1,362,630	299,090
Ljungby	Ljungby Energi AB	56,460	47,880	136,290	15,730
Malmö	Sysav förbränningsanläggning	569,000	180,100	1,245,380	200,450
Mora*	Avfallsförbränningen Mora	20,320	12,300	59,000	0
Norrköping	E.ON Händelöverket	368,000	24,000	843,000	123,000
Nybro	Kraftvärmeverket Transtorp	59,980	44,400	126,480	28,880
Sigtuna*	Brista kraftvärmeverk	229,270	104,160	477,560	96,600
Skövde	Värmekällan	55,430	31,820	158,300	4,230
Stockholm	Högdalenverket	703,710	306,040	1,868,710	322,880
Sundsvall	Korsta kraftvärmeverk	182,780	71,050	534,560	65,040
Södertälje	Söderenergi	446,250	0	1,662,810	295,510
Uddevalla	Lillesjö Avfallskraftvärmeverk	120,870	43,500	275,620	69,350
Umeå	Dåva kraftvärmeverk	151,310	84,370	369,310	50,830
Upplands-Bro*	Högbytorp kraftvärmeverk	214,000	0	559,040	126,520
Uppsala	Vattenfall AB Värme Uppsala	316,960	97,870	1,106,460	25,320
Västervik	Stegholmsverket	46,000	17,160	136,100	19,340
Västerås	Västerås Kraftvärmeverk	555,390	161,490	1,443,350	476,710
Total		6,829,180	2,066,340	17,920,670	3,045,280

Avfall Sverige's statistics mainly relate to waste incineration plants that receive household waste. Most also accept other waste.

The total amount of waste also includes imported waste.

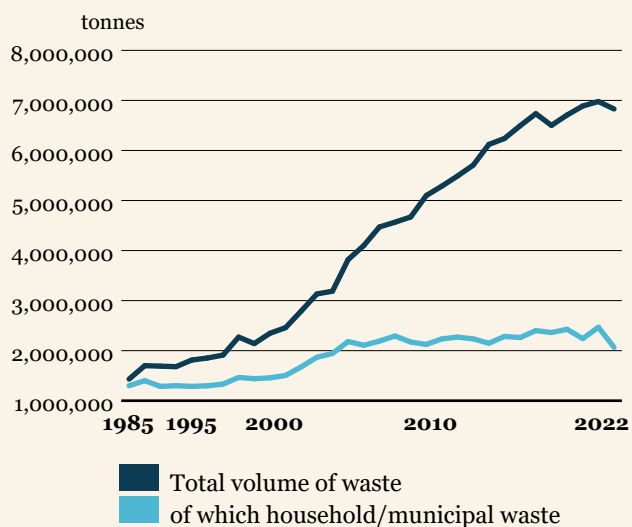
Energy recovery relates to total waste, not just household waste.

*) Data refers to the year 2021, has not reported data for 2022

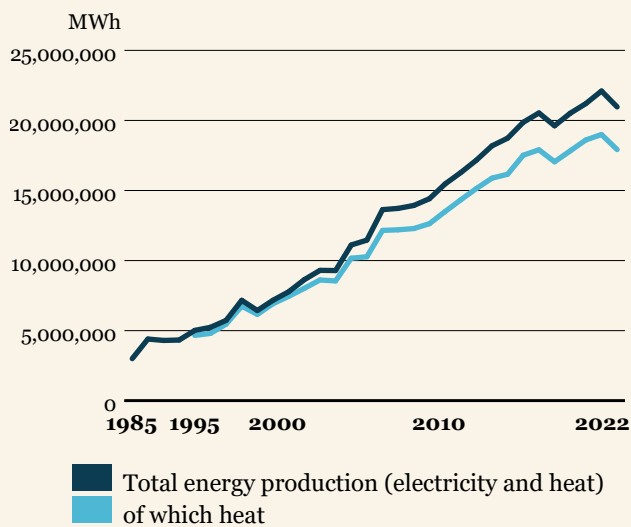
Energy recovery 2018–2022

	2018	2019	2020	2021	2022
Incineration (tonnes)					
Household/municipal waste	2,362,160	2,426,610	2,240,990	2,468,270	2,066,340
Business waste	4,138,760	4,281,900	4,646,980	4,510,220	4,762,840
Total	6,500,920	6,708,510	6,887,970	6,978,490	6,829,180
Production (MWh)					
Heating	17,049,448	17,824,810	18,607,670	18,994,400	17,920,670
Electricity	2,183,250	2,296,890	2,593,970	3,104,700	3,045,280
Total	19,232,698	20,121,700	21,201,640	22,099,100	20,965,950
Slag, bottom ash (tonnes)	974,100	1,192,270	1,024,510	1,027,440	1,066,930
RGR, fly ash (tonnes)	281,070	293,070	303,060	299,370	266,840

Waste to energy recovery 1985–2022



Energy production from waste 1985–2022



Waste treatment plants with landfills



34,100 tonnes
of household waste went to
landfill in 2022.

Landfill

● **0.9 GWh heating**
● **0.04 GWh electricity**

In 2022, a total of 2.8 million tonnes of waste went to landfill at 65 of the 106 plants reporting in Avfall Web. This is an increase of 4 percent compared to 2021. 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. These plants received 34,100 tonnes of household waste, which represents 1.2 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 2022, approximately 130 GWh of landfill gas was collected at 40 waste treatment plants, of which 76 GWh was used for energy.

⁶⁵Avfall Sverige Report no. D2013:02 Landfill gas handbook

Energy recovery consisted of approximately 3 GWh in the form of electricity and 72 GWh in the form of heating. In all, 54 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 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 2022, 7.1 million cubic metres of leachate was processed at 99 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.

Waste is still sent to landfill at 62 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

Plants that send household waste to landfill 2022

Municipality	Plant	Total, tonnes	of which household waste, tonnes	Recovered energy, MWh
Alingsås	Bälinge*	29,680	80	1,220
Arvika	Mosseberg Deponi	2,100	230	240
Borlänge	Fågelmyra Avfallsanläggning	11,680	2,460	110
Borås	Sobackens Deponi	105,130	140	60
Bromölla	Åsens avfallsanläggning	3,870	630	0
Dorotea	Bergvattnet	100	100	0
Eda	Lunden	350	60	0
Eslöv	Rönneholms avfallsanläggning	830	450	220
Gotland	Slite avfallsanläggning	670	670	0
Grums	Karlbergs avfallsstation	100	80	0
Gällivare	Kavahedens Avfallsanläggning	2,880	240	0
Hagfors	Holkesmossen avfallsanläggning	3,530	1,190	40
Halmstad	Skedala AFA (Brogård)	2,060	490	0
Helsingborg	NSR Deponianläggning	1,570	330	4,320
Härnösand	Älands avfallsanläggning	18,780	200	1,870
Hässleholm	Vankiva Aktiva deponier	156,610	120	0
Jönköping	Miljöhantering i Jönköping	4,420	870	0
Kalmar	Moskogens avfallsanläggning	143,810	1,620	510
Karlskoga	Mosseruds Återvinningsanläggning	3,670	1,410	1,110
Karlskrona	Mältans avfallsanläggning	3,590	780	0
Karlstad	Avfallsupplag Djupdalen	14,260	2,000	0
Kil	Lersätters avfallshanteringsområde	16,570	460	230
Kiruna	Kiruna deponi	290	160	0
Klippan	Hyllstofta avfallsanläggning	270	60	1,040
Kramfors	Högbergets avfallsanläggning	7,430	290	0
Laholm	Ahla deponi och återvinningscentral	1,290	330	0
Lidköping	Kartåsens avfallsanläggning	22,780	190	0
Linköping	Gärstad avfallsanläggning	5,030	1,360	0
Ljungby	Bredemads avfallsanläggning	2,880	680	0
Malmö	Spillepens avfallsanläggning	10,480	250	6,620
Motala	Tuddarps avfallsanläggning	2,360	410	0
Nyköping	Björshults avfallsanläggning	290	30	1,630
Oskarshamn	Storskogens avfallsanläggning	2,490	180	0
Piteå	Bredviksbergets avfallsanläggning *	8,980	390	0
Skellefteå	DEGERMYRAN	17,190	610	0
Sunne	Holmby Avfallsanläggning	1,410	400	340
Söderhamn	Långtå avfallsanläggning	4,460	180	0
Umeå	Dåva Deponi- och avfallsanläggning	91,670	1,230	0
Upplands-Bro	Högbytorps Avfallsanläggning *	710,250	4,030	4,740
Uppsala	Hovgårdens avfallsanläggning	7,880	60	0
Vetlanda	Flishults avfallsanläggning	58,360	700	0
Vänersborg	Ragn-Sells Heljestorp	193,230	850	3,290
Vännäs	Starrbergets avfallsanläggning (new)	15,750	3,380	0
Västervik	Målserums avfallsanläggning	1,700	110	0
Växjö	Häringetorp behandlingsanläggning	4,460	1,430	470
Ystad	Hedeskoga avfallsanläggning	6,130	840	1,840
Älmhult	Äskya	1,650	50	130
Örebro	Atleverket	114,480	360	4,370
Östersund	Gräfsåsens deponi	6,790	940	0
Other plants in Avfall Web		1,015,110		41,230
Total		2,841,350	34,110	75,630

* shows values from 2021

Volumes sent to landfill 2018–2022 (tonnes)

	2018	2019	2020	2021	2022
Volume sent to landfill	2,043,310	2,649,310	2,782,750	2,738,060	2,841,350
of which household waste	32,710	37,370	42,500	44,220	34,100

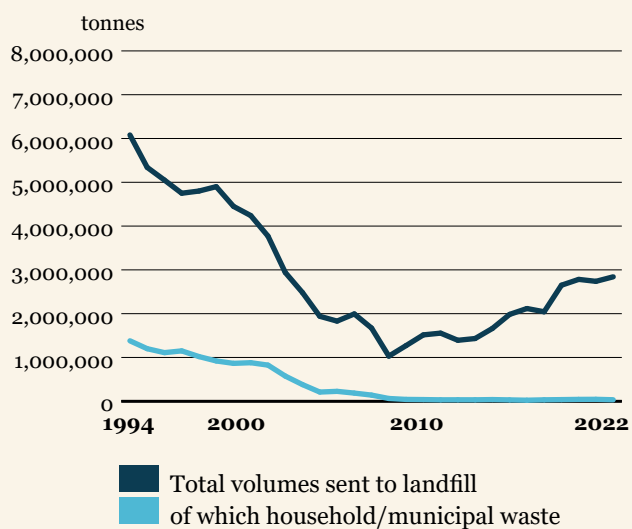
Avfall Sverige's landfill statistics do not provide a complete picture of landfill in Sweden. Initially, the idea was to keep statistics on plants that accepted household waste. Today, many of these plants no longer accept household waste. There is some uncertainty about the figures for household waste,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

Energy recovery at landfill sites 2018-2022 (MWh)

	2018	2019	2020	2021	2022
Useful energy	93,040	94,220	82,750	80,020	75,630
of which electrical energy*	7,210	4,150	3,180	3,350	3,160
Flaring	46,060	41,990	53,050	70,380	54,140

* Other energy is used for heating

Volumes sent to landfill 1994–2022



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 2,542 in waste charges in 2022, according to data from Avfall Sverige's statistics system Avfall Web. This is a five-percent increase compared to 2021. Apartment households paid an average of SEK 1,528 in 2022, while the average charge for second homes was SEK 1,514. On average, a Swedish household pays SEK 6 per day for waste management. The increase for apartments and second homes is four percent compared to the previous year. On average, the basic charge makes up 45 percent of the total charges for single-family houses.

Many municipalities that introduced the voluntary collection of food waste use the charge as an incentive⁶⁶. Then, for example, households that separate food waste pay a lower charge than those that choose to leave mixed waste for collection. From 2024, the separation of food waste will be mandatory for all households and businesses. This type of environmental management will then be gradually phased out.

To achieve a higher 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 charge⁶⁷. 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

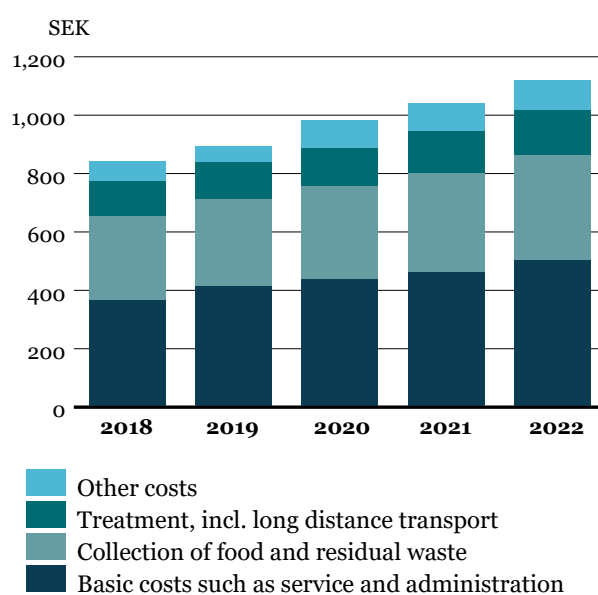
varies between SEK 1.13 and SEK 4.50 per kg for residual waste and between SEK 0 and SEK 4.30 for a food waste bin, combined with various types of bin charges and the fixed basic charge. 32 of the country's municipalities had a weight-based charge in 2022. Some municipalities with food waste collection have lower weight charges for food waste; in some municipalities it is free.

In 2022, the total cost for waste management to municipalities was on average SEK 1,121 per person, excluding VAT. The municipal cost for the collection of food and residual waste averaged SEK 361 per person, and the cost of treatment averaged SEK 155 per person. The basic cost averaged SEK 501 per person. The cost per household is generally higher in municipalities with small populations versus those with large ones⁶⁸.

INSTRUMENTS OF CONTROL

There are several 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 compulsory 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.

Waste management costs, SEK per person excl. VAT, 2018–2022

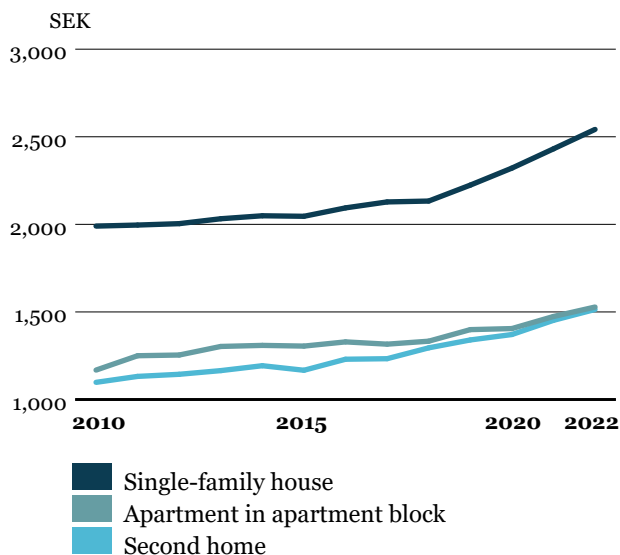


66 Avfall Sverige Report 2020:28 Eco-based waste charges – use, effect and good examples

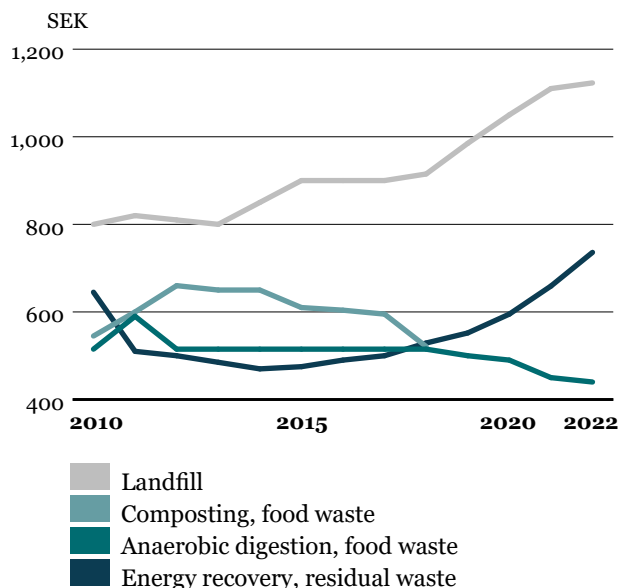
67 Avfall Sverige Report U 2014:05 Eco-based charge? A guide to weight-based waste charge prior to decision, for implementation and operation

68 Avfall Sverige Report 2016:29 Calculation of waste management costs in Sweden municipalities

Average waste charges per household SEK, incl. VAT, 2010–2022



Treatment charges excl. VAT 2010–2022, 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 2022

	Anaerobic digestion, food waste	Energy recovery, residual waste	Landfill
Average	440	740	1,120
Interval	180-780	380-880	730-1,660

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

Tax on waste sent to landfill was introduced in 2000 as a way to reduce landfill. At that time, the tax was SEK 250 per tonne. It has since been raised at different intervals. Since 2019, the tax is indexed. It amounted to SEK 634 per tonne in 2023. The Government proposes a new method for indexing the tax, which means that the tax on landfilled waste may be increased to SEK 725 per tonne.

A new tax on the incineration of waste was introduced on 1 April 2020. The tax amount has been increased in stages from SEK 75 per tonne in 2020 to SEK 125 per tonne in 2022. The tax was done away with in January 2023. At the same time, the carbon tax on combined heat and power production was also eliminated.

Municipalities often pay a charge to get their waste treated. Treatment charges can vary greatly. The charge for energy recovery from residual waste was SEK 740 in 2022, an increase of 12 percent compared to 2021. The large increase is partly due to the incineration tax,



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.

but mainly due to an increase in the cost of emission allowances for plants. The charge for anaerobic digestion decreased by two percent, from SEK 450 to SEK 440 in 2022. The landfill charge increased marginally compared to 2021.

READ MORE IN AVFALL SVERIGE'S REPORTS

- 2022:15 Guidance for structuring waste charges
- Municipal waste in figures 2020

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 2020⁶⁹. 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.

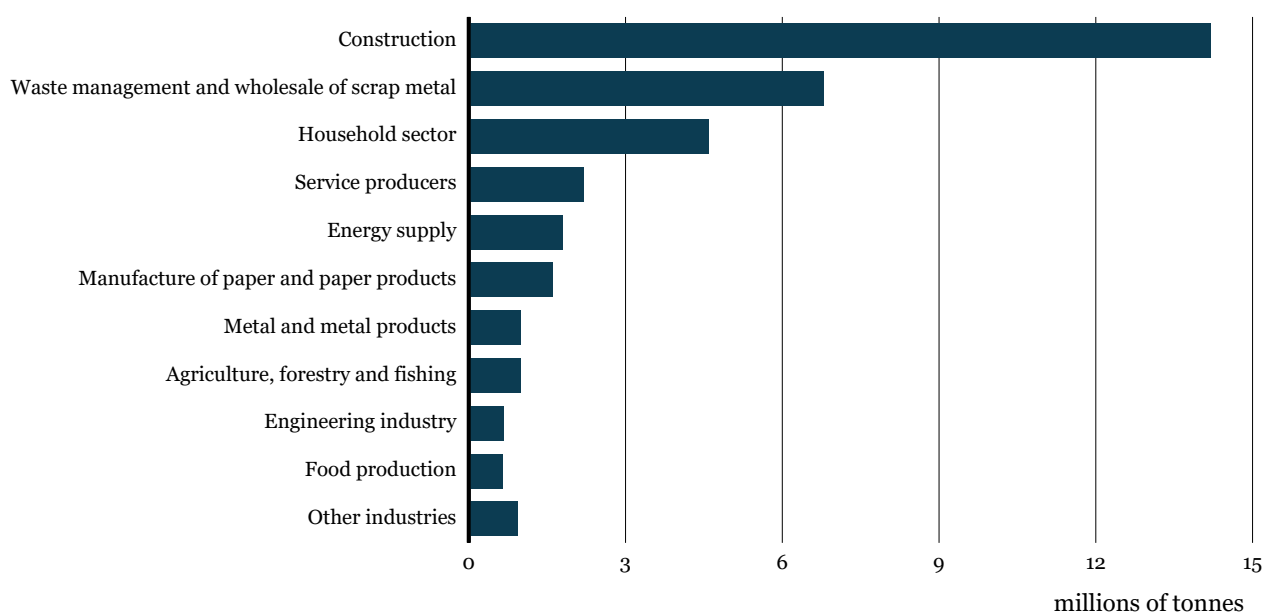
Businesses are responsible for managing their own non-municipal waste. Some businesses have their own landfill sites at their disposal or can recover energy from waste in their own plants.

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.

⁶⁹ Report 7048 Waste in Sweden 2020

2022 in brief

AVFALL SVERIGE

- Avfall Sverige celebrated its 75th anniversary, among other things by issuing an anniversary publication.
 - The EUicto association was formed to promote cooperation on the common Nordic symbol language for waste sorting. The municipal waste organisations in Denmark, Iceland, Finland and Sweden are behind the association.
 - Avfall Sverige signed a new Memorandum of Understanding with the United Nations Development Programme (UNDP) for the continued mission to support the global development of sustainable waste management and waste prevention.
 - Avfall Sverige launched a new network for recycling centres. At the same time, the network for younger people in the industry was deemed to have outlived its usefulness and was discontinued.
 - As in previous years, plastic was a major issue in 2022. One contribution to the debate was the Unity project, where Avfall Sverige, in collaboration with academic research institutes and plastic producers, showed that the hundreds of different plastics used in many products today could be replaced by a dozen, thereby creating a market and facilitating material recycling.
 - A strategy for bio-CCS that will lead the way to negative emissions from the district heating sector was presented in cooperation with Energiföretagen.
 - Several concrete projects to reduce the volume of plastic sent for energy recovery were carried out. Among other things, a handbook was presented with advice on how energy companies, municipalities and property owners can jointly contribute to both increased sorting of plastic for material recycling and reduced consumption. An important study on the benefits and costs associated with energy recovery was also produced, with the aim of clarifying the socioeconomic effect at a national level.
 - The work to develop a new cooperation agreement between El-Kretsen and the municipalities was completed.
 - Tony Clark, CEO of Avfall Sverige, was appointed Vice Chair of Municipal Waste Europe (MWE), the European association of national municipal waste organisations.
 - The Government appointed the CEO of Avfall Sverige, Tony Clark, to be part of the Circular Economy Delegation.
 - The members gathered for the first time in three years for a physical annual meeting, this time in Norrköping with more than 500 participants.
 - The autumn meeting was held digitally, with the theme Game Changers.
 - The new avfallsverige.se saw the light of day, with associate members highlighted on their own page.
- Sweden received its first action plan for plastics, with measures in the form of legislation, budget initiatives and government assignments.
 - Waste crime was a hot issue. A report from the Swedish Environmental Protection Agency and a number of other authorities led to a parliamentary decision that financial security may be required for certain environmentally hazardous activities with associated reporting obligation, including landfills. Interpol and Europol also identified waste crime as a growing cross-border and problematic area.
 - The Committee on Environmental Objectives proposed zero emissions from consumption as a target for Sweden to achieve net zero emissions by 2045. If adopted, Sweden would be the first country in the world to include emissions from consumption in its climate work.
 - The Government decided on stricter producer responsibility for electronics, including requirements for a longer lifespan.
 - The Land and Environment Court of Appeal ruled in favour of the company Tiptapp. In view of the way the local regulations are formulated, Tiptapp may continue to offer its services to Stockholm residents to arrange the removal of waste.
 - The Land and Environment Court in Växjö overturned a judgement requiring a McDonald's restaurant in Ystad to sort packaging.
 - The tax on waste going to landfill was increased to SEK 573 per tonne.
 - A government inquiry proposed three exemptions to the taxes on landfill and incineration.
 - VAT on certain repairs was reduced from 12 to 6 percent. After a new government took office in the autumn, they announced plans to raise it again.
 - Nitrous oxide containers posed problems for both sanitation and energy recovery, as misuse has become common and pressurised containers are not recycled properly.

EU AND GLOBAL

- Russia's war against Ukraine was reflected in the European Commission's REPowerEU plan. This presented proposals to phase out the EU's dependence on energy imports from Russia, including by investing in biogas. Avfall Sverige pointed to biogas production and energy recovery as important and plannable energy sources, especially in light of the energy crisis that emerged during the year.
- The ecodesign proposal from the European Commission was presented with proposals for measures to make sustainability the norm.
- The European Commission and companies linked to the biogas industry launched a platform for cooperation on biogas – the Biomethane Industrial Partnership (BIP).
- The European Commission presented a proposal for a packaging regulation, including requirements that packaging should be reduced, but also be reused and recycled to a greater extent.
- The price of emission allowances within the EU ETS rose from USD 25 to USD 90 per tonne.
- A European Commission framework document clarified the concepts of bio-based, compostable and biodegradable plastics and provided guidance on when and how to use them.

SWEDEN

- The Government decided that municipalities will take over the responsibility for collecting packaging from producers beginning in 2024. However, producer responsibility remains in force, so the costs of collection will continue to be borne by producers.
- The Swedish Environmental Protection Agency proposed that certain waste streams of municipal waste should not be subject to municipal responsibility.

Waste agenda

2030

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



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).

2025

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

From 1 January, separate collection of textiles shall be made mandatory, as the general rule. This rule also requires the separate collection of, as a minimum, paper, metal, plastic and glass (this refers to waste other than packaging waste). No requirements for separate collection have yet been regulated in Swedish legislation for fractions other than textiles, with the exception of construction and demolition waste.

Hazardous waste shall be produced, collected, transported, stored and treated in a manner that protects the environment and human health, and shall be tracked and monitored.

Producer responsibility for fishing gear is introduced. The municipalities are responsible for collecting fishing gear from non-commercial activities at the recycling centre and for waste from ships at port receiving facilities.



..... **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



..... **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.

..... **2026**

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

..... **2024**

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

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

..... **2023**

National milestone target that at least 75 percent of food waste will be sorted and treated biologically so that plant nutrients and biogas are recovered.

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 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. Avfall Sverige often acts as intermediary between members and others who can contribute more knowledge and experience on various issues.

MEMBERSHIP DEVELOPMENT IN 2022

In 2022, 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 143 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, both physical and web-based, 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. 29 courses and theme days were held in 2022, of which 13 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 563 development projects with a total cost of approximately SEK 143 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.

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, 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. Avfall Sverige launched Avfall Web 2.0 in 2022.

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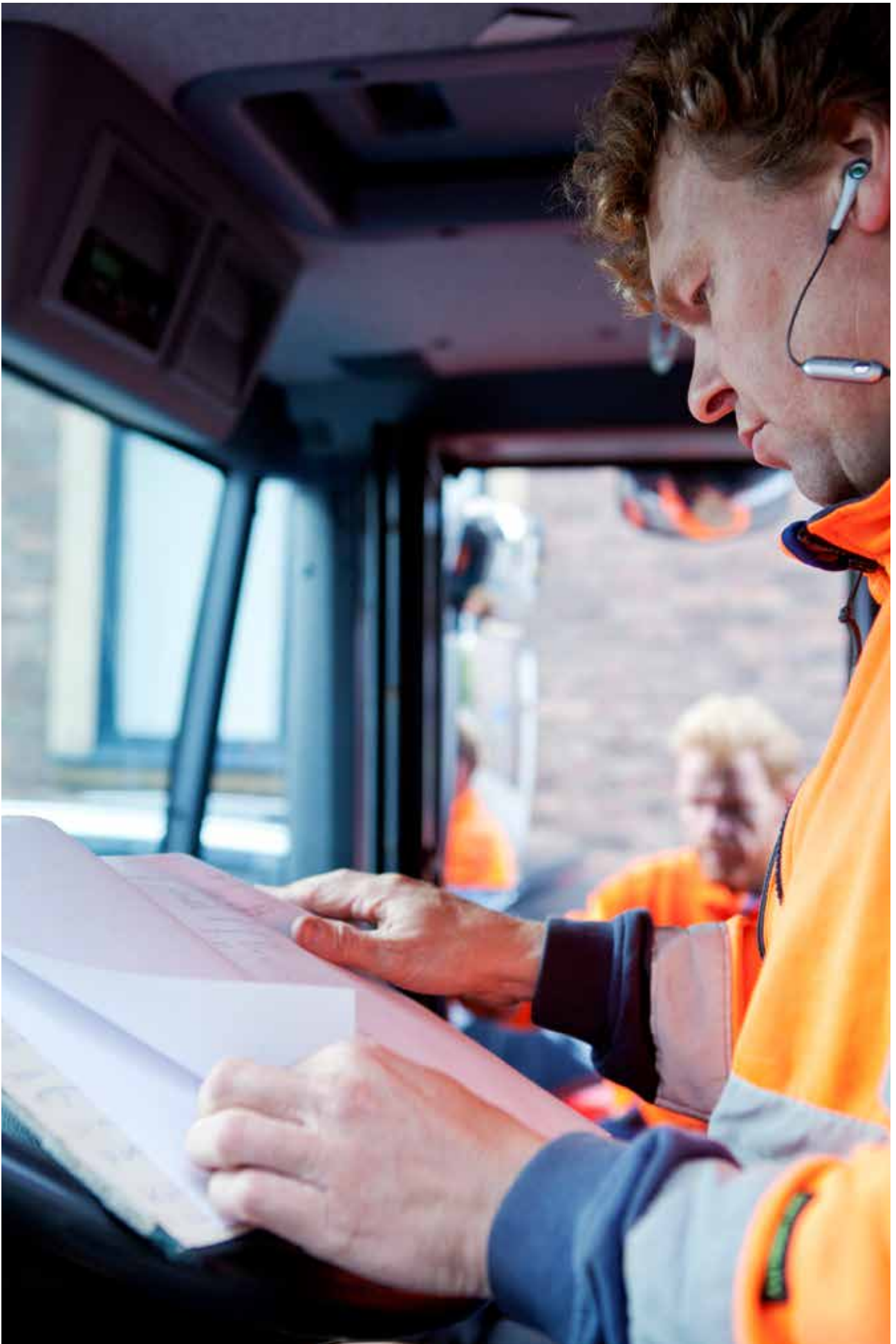
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