

SWEDISH WASTE MANAGEMENT | 2011



PREFACE

Waste management in Sweden is focusing more and more on waste minimization and waste prevention. Waste minimization is a top priority for the members of Avfall Sverige – Swedish Waste Management. This philosophy is exemplified by the long term vision – “Zero Waste” – adopted at the 2011 Annual Meeting. The vision includes two long-term goals for 2020: a) to break the relationship between waste and growth and b) to achieve clear, strong upward movement in the waste hierarchy. The municipalities are key players and the vision states that the municipalities are the drivers in the transition and the guarantee for long-term sustainable waste management.

Sweden and Europe as a whole are striving to reduce waste quantities. The EU framework Directive on Waste requires member states to work to prevent waste generation. Member states must develop waste reduction plans with the goal of reducing waste by 2020. Nationally, Avfall Sverige – Swedish Waste Management and the local authorities are key players in this process.

Avfall Sverige – Swedish Waste Management is also the national coordinator of the EU project “European Week for Waste Reduction”, also supported by the Swedish Environmental Protection Agency. The project is aimed at reducing waste quantities as well as the amount of hazardous substances in the waste.

2010 saw the waste quantities decreasing for the second consecutive year. While it is still too early to draw substantial conclusions, it is encouraging that the trend may have reversed.

It is imperative however, not to forget the important task of taking care of the waste that is generated, despite all prevention efforts. From information and collection to processing and recycling, with constantly evolving methods, the Swedish waste management system is today environmentally sound, sustainable and socially responsible.

District heating from waste is replacing fossil fuels, as is biogas derived from food waste. Recycling helps to reduce extraction of virgin raw materials.

Sweden is one of the leading nations in waste management –an impressive 99 percent of the household waste is recycled as energy or material. The environmental objective to recycle at least 50 percent of household waste, including biological treatment, by 2010 was essentially met.

With Swedish Waste Management 2011, we turn to participants in the waste industry, policy makers, government agencies, educational institutions, media and all other interested parties. We present text, figures and tables describing how household waste is handled in Sweden.

Statistics in the annual publication Swedish Waste Management 2011 are obtained from the Swedish Waste Management’s web-based statistics system Avfall Web, and from the producers’ organizations. We hope this publication will increase interest in Swedish waste management.

Weine Wiqvist, Managing Director
Avfall Sverige – Swedish Waste Management

HOW SWEDISH WASTE MANAGEMENT WORKS

Waste shall be managed in a way that achieves maximum environmental and societal benefits. Everyone participates in this effort: producers, businesses, municipalities and households.

The municipalities are responsible for household waste, producers are responsible for their various product groups, and the operators in the sector are responsible for taking care of all waste which is not household waste.

Households are responsible for separating and depositing waste at the various available collection points. Households are also responsible for complying with municipal waste management regulations.

If possible, waste should be managed according to the waste hierarchy order of priority:

- waste prevention
- reuse
- material recycling
- recovery – such as energy recovery
- disposal

Exceptions from the hierarchy may be necessary for technical, financial or environmental reasons.

EU decisions set the frameworks for Swedish waste management. The environmental objectives of the Swedish Parliament (Riksdag) have piloted Sweden toward more environmental waste management. The country's municipalities have played a key role in this effort.

Now new milestones await. The All Party Committee on Environmental Objectives proposes the following targets:

- By 2015, food waste shall be reduced by at least 20 percent compared with 2010
- By 2015, at least 40 percent of food waste from households, caterers, retail premises and restaurants will be biologically treated to provide fertilizer and energy
- By 2015, at least 60 percent of phosphorus pollution in effluent shall be treated and used on productive lands, of which at least half should be used on arable land
- By 2020, reuse and material recycling of non-hazardous construction and demolition waste shall be at least 70 percent

The most important treatment methods for waste are:

- material recycling
- biological treatment
- Waste-to-Energy
- landfill

Hazardous waste can be treated with one or several of these methods, depending on the character of the waste.

Recycling of packaging, paper, scrap, waste from electrical and electronic equipment (WEEE), and batteries reduce the environmental impact and save energy and resources.

Biological recycling is implemented through anaerobic digestion or composting. Anaerobic digestion produces biogas which can be used as vehicle fuel. Anaerobic digestion also produces digestate which is an excellent nutrient. Composting produces long-lasting fertilizer used as soil improver in gardens, parks and for ground installations. Biological recycling thus closes the ecocycle and returns nutrients to the soil.

Waste-to-Energy is an effective and environmentally safe method for producing energy from waste. It provides both heat and electricity. Waste-to-Energy is a method well suited for waste which cannot be treated in any other way.

Landfilling is a treatment method for waste which cannot or should not be recycled. Landfilling means that waste is stored in a manner that is safe for the long-term, and this treatment method is controlled by a strict regulatory framework. Landfilling of organic or combustible waste is forbidden.

The local authorities may choose how to organize waste management. This option for municipal self-government is laid down in constitutional law. The local authorities may choose management system and municipal undertakings, separate or jointly with other municipalities. Cooperation is also possible in a joint committee or a local government federation.

Some local authorities also cooperate on specific matters, such as joint procurements. To many local authorities, collaboration is a natural solution to attain the best possible environmental and social benefits, to achieve cost-efficient waste management and to guarantee the competence required, which benefits both residents and the environment.

In 75 percent of Swedish municipalities, external actors, private companies, manage household waste collection, while in the rest the municipalities provide this service. Waste treatment is effected either by the municipalities themselves or by an external actor, often a municipal enterprise or sometimes a private company.

WASTE MINIMIZATION

Preventing waste generation is the top step of the EU's waste hierarchy. It is also a priority in the national environmental objectives and in the national waste plan.

In Sweden we are good at recovering material, energy and nutrients from waste, which provides major environmental benefits. But we can achieve even more. The environmental benefit is greater if a product is never produced than if it is produced, used and ultimately recycled.

Swedish municipalities have accepted a large responsibility to reduce waste and the quantity of hazardous substances in the waste that is generated. A report from Avfall Sverige – Swedish Waste Management¹ provides a host of examples of measures that have actually succeeded in substantially reducing waste quantities:

- Kretsloppsparken Alelyckan in Gothenburg prevents 360 tons of waste annually because products can be reused instead of discarded.
- Kiruna reduced food waste in school cafeterias by eliminating food trays – pupils can no longer take as much food each time.
- Bjurhovda School in Västerås received an award for its efforts to reduce the amount of food thrown away in the school cafeteria. When the project began, the school threw away ten kilograms of food daily; one year later the figure was down to 6.8 kilograms daily. Averaged over one year, food waste was reduced by 640 kilograms, resulting in both economic savings and lower environmental impact.
- Gästrike Återvinnare is heavily engaged in a waste reeducation campaign. All municipality waste collection vehicles paraded through the center of town to demonstrate the amount of waste generated in Gävle.
- Gävle is also running the Hållbara familjer (Sustainable Families) project, in which several families are tasked with changing their lifestyle in a more environmentally aware direction for one year. The project focuses on energy, food, travel and recycling.
- Gothenburg is running a similar project, Leva livet (Live Life). Families reduced food waste by one quarter, newspapers and magazines by one tenth and ordinary trash by about 40 percent over the course of the project.

Waste minimization is a top priority for the members of Avfall Sverige – Swedish Waste Management. This philosophy is exemplified by the long term vision – “Zero Waste” – adopted at the 2011 annual meeting. The vision includes two long-term goals for 2020: a) to break the relationship between waste and growth and b) to achieve clear, strong upward movement in the waste hierarchy. The municipalities are key players and the vision states that the municipalities are the driver in the transition and the guarantee for long-term sustainable waste management.

The vision and the long-term objectives for 2020 are the result of a project that members participated in for one year.

Avfall Sverige – Swedish Waste Management is also 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 in November with organized activities throughout Europe aimed at reducing waste and the quantity of hazardous substances in waste. The project began in 2009 and ended in its current form in 2011, but will be replaced by a new project that will run until 2015.

COLLECTION AND TRANSPORT

There are various systems for collection and transport of household waste. The household waste in bins and bags may be collected either as a mixed fraction intended for Waste-to-Energy or in separate fractions – one for food waste and one for combustible waste. About 30 municipalities have also introduced curbside collection of packaging and newspapers from single-family homes.

Mixed combustible waste from single-family houses is in most cases collected in 190 liter wheelie bins and emptied every other week. There are also a number of different bag and bin sizes which are emptied in various intervals. Waste is usually collected from apartment blocks every week.

The most common systems for collection of source-separated food waste is by separate bins – one for bio-waste and one for combustible waste – by multi-compartment bin, or by optical sorting. Optical sorting requires households to separate waste into different colored bags that are placed in the same bins. The bags are then taken by the waste collection vehicle to an optical sorting facility where the bags are separated automatically for the right treatment.

Traditional rear-loading vehicles are still the most common waste collection vehicles, but the technology for multi-compartmented vehi-

cles is developing and becoming more and more popular, while side-loading vehicles account for a more constant share of the operators' vehicle fleet.

An increasing number of vehicles use biogas as fuel, which the local authorities may control through procurement requirements. In addition, several municipalities use other alternative fuels such as RME, as well as various hybrid technologies in vehicles to reduce their carbon footprint.

Waste collection previously was subject to various work-related injuries. Daily heavy lifting was part of the job and waste collection required workers to be in good physical shape. Due to the tough working conditions however few waste collectors were able to physically last until the national average retirement age. Today the situation is different. Bags have been replaced with bins or other types of containers. Manual handling of waste is being replaced with new technology and automated systems, such as refuse vacuum systems and underground container systems. Both of these systems are on the rise, particularly in large cities. One of several advantages is that they do not require as heavy manual handling.

From the standpoint of occupational health and safety, vacuum collection is a good system since it is sealed and completely auto-

mated. This type of collection system reduces the need for waste transportation, especially in residential areas. There are two kinds of vacuum collection systems, a stationary system and a mobile system. With the stationary system, waste is collected with air in an automated vacuum system. It is transported through underground tubes, which connect the inlets with big containers placed in a terminal. With this technique, waste can be transported up to a distance of two kilometers from the inlets. The number of containers varies and depends on the one hand upon the number of collected fractions, and on the other hand on the waste volumes. The containers are collected by hook-lift vehicles.

The mobile vacuum collection system also uses air to collect the waste, but here the vacuum technique sits in the vehicle. A storage tank is positioned under each inlet. The tanks are connected, via an underground pipe system, to a so called docking point which can be placed at a maximum distance of 300 meters from the tanks. The vehicle connects to the docking point for emptying, the vacuum system is turned on and air transports the waste from the different storage tanks to the docking point and onto the vehicle. Mobile vacuum collection systems require specialized vehicles.

Another collection system that is on the rise is the underground container system. Placing larger containers underground reduces the need for space on street level. The temperature below street level, where the waste is contained, is relatively low, which prevents odor, and the containers are easily emptied with a hook lift vehicle. There are also underground containers that are emptied with front-loading vehicles. Since the underground containers carry larger volumes, the number of transports can be reduced.

At the municipalities' manned recycling centers, the households themselves drop off bulky waste, electronic waste and hazardous waste. Bulky waste is household waste, which is too heavy, too bulky or for other reasons inappropriate for collection in bags or bins. In 2010, households dropped off 1.5 million tons of bulky waste, most of which was handed to the manned municipal recycling centers. A smaller part, about ten percent, was collected through curbside collection. The bulky waste volumes correspond to 161 kg per person. There are about 600 recycling centers throughout the country, and in total they receive about 20 million visits annually.

The volumes of bulky waste and hazardous waste that are handed to the recycling centers have increased significantly in recent years.

Several municipalities have therefore adapted and modernized their recycling centers. Smaller recycling centers are typically closed when the municipalities build new, larger centers better-suited to the waste quantities and number of visitors.

Several recycling centers in Sweden have had severe problems with burglaries and thefts in recent years, as well as incidents when staff have been personally threatened. Most of the larger modern recycling centers have therefore installed electric fences, which have considerably reduced the number of break-ins. In order to improve safety, and for the sake of a functional system for access control that would enable more accurate visitor statistics, several of the municipalities also introduced a barrier gate system at the recycling centers. This system is often combined with an entry card which allows households to a certain number of free visits. Small business owners may also use the services offered at the recycling centers in several of the municipalities for a fee.

The producers' system includes approximately 5,800 unmanned recycling stations for packaging and newspaper that cover the entire country. The collection systems should be formed in consultation with both producers and local authorities. The recycling stations

have separate bins for newspaper and various packaging material.

A growing number of municipalities are implementing curbside collection of packaging and newspaper from apartment blocks and single-family homes.

According to a survey by Avfall Sverige – Swedish Waste Management², about 60 percent of what households place in trash bags can be recycled and in households that do not sort food waste the figure is almost 80 percent. The survey has compiled 246 Waste-Analyses carried out in Sweden's municipalities since 2007. Single-family homes are generally better at sorting out recyclable materials; about 20 percent of their household waste consists of packaging and newspapers. In apartment households this figure is 36 percent. One half percent of the waste is hazardous waste, batteries and waste from electrical and electronic equipment (WEEE).

The system chosen for collection also affects the degree of sorting. Single-family homes with curbside collection, source separate the waste most effectively, with half the amount of packaging and paper in the trash compared to other households.

WASTE QUANTITIES 2010

In 2010 the quantity of household waste decreased for the second consecutive year. The quantity of treated household waste was 4,363,880 tons, a reduction of 2.7 percent compared with 2009. Divided over the population, each Swedish resident produced 463 kg of household waste in 2010, to be compared with 480 kg per person in 2009.

It is too early to draw long-term conclusions from the decline in the amount of waste over the past two years. Nevertheless, it is encouraging that the trend has reversed, even if it proves to be only temporary.

In Sweden 1 percent of household waste was landfilled in 2010, a decrease of 33 percent from 2009.

The environmental objective to recycle at least 50 percent of household waste, including biological treatment, by 2010 was essentially met. A total of 49.2 percent of household waste went to material recycling or biological treatment and 48.7 percent went to energy recovery. The breakdown is essentially the same as for 2009.

Hazardous waste accounted for 1.2 percent of household waste, an increase of 13 percent

compared with 2009. The figure for hazardous waste now also includes asbestos.

Biological treatment of food waste, excluding home compost, increased by 20 percent to 214,300 tons in 2010.

Anaerobic digestion increased by 21 percent compared with 2009. Composting is declining, probably because branches and large twigs now go to Waste-to-Energy instead of to composting.

This year we can also report the collected volume of waste in bins and bags as well as bulky waste.

COLLECTED VOLUME OF WASTEBINS AND BAGS AS WELL AS BULKY WASTE 2006–2010 (TONS)

	2006	2007	2008	2009	2010
Waste in bins and bags	2,234,300	2,211,900	2,226,700	2,167,800	2,152,000
Bulky waste	1,237,200	1,227,400	1,421,100	1,498,400	1,518,000

(KG/PERSON)

	2006	2007	2008	2009	2010
Waste in bins and bags	245	241	241	232	229
Bulky waste	136	134	154	160	161

Source: Avfall Web/Avfall Sverige - Swedish Waste Management 2011

TREATED QUANTITY HOUSEHOLD WASTE 2006-2010 (TONS)

	2006	2007	2008	2009	2010
Hazardous waste	38,960	40,880	43,320	45,380	51,430
Material recycling	1,657,520	1,737,720	1,657,840	1,586,600	1,559,600
Biologic treatment	469,880	561,300	597,280	617,680	587,170
Waste-to-Energy	2,107,860	2,190,980	2,292,970	2,173,000	2,123,680
Landfill	226,000	186,490	140,250	63,000	42,000
Total quantity treated	4,500,220	4,717,370	4,731,660	4,485,660	4,363,880

TREATED QUANTITY HOUSEHOLD WASTE 2006-2010 (KG /PERSON)

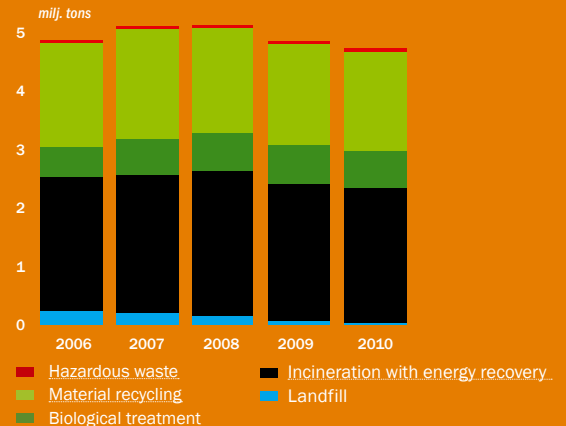
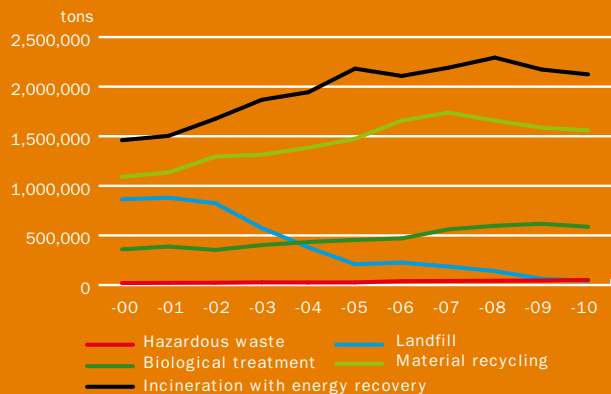
	2006	2007	2008	2009	2010
Hazardous waste	4.3	4.5	4.7	4.9	5.5
Material recycling	181.9	189.2	179.1	169.9	165.6
Biologic treatment	51.6	61.1	64.5	66.1	62.4
Waste-to-Energy	231.3	238.6	247.7	232.6	225.5
Landfill	24.8	20.3	15.2	6.7	4.5
Total quantity treated	493.8	513.7	511.2	480.2	463.5

TREATED QUANTITY HOUSEHOLD WASTE 2006-2010 (%)

	2006	2007	2008	2009	2010
Hazardous waste	0.9	0.9	0.9	1.0	1.2
Material recycling	36.8	36.8	35.0	35.4	35.7
Biologic treatment	10.4	11.9	12.6	13.8	13.5
Waste-to-Energy	46.8	46.4	48.5	48.4	48.7
Landfill	5.0	4.0	3.0	1.4	1.0
Total quantity treated	100	100	100	100	100

Source: Avfall Sverige - Swedish Waste Management

2000-2010



HAZARDOUS WASTE

In 2010, 51,430 tons of hazardous waste were collected from households. On average each Swede handed in 5.5 kg of hazardous waste. The quantity also includes 25,030 tons of impregnated wood and 4,370 tons of asbestos. Hazardous waste represented 1.2 percent of the household waste.

Hazardous waste can be toxic, carcinogenic, corrosive, toxic for reproduction, ecotoxic, infectious or flammable. The hazardous substances may occur in extremely small quantities in some products, but collectively they can cause substantial damage if they end up in the wrong place. It is therefore important that hazardous waste is separated from other waste and handed in correctly.

Local authorities are responsible for hazardous household waste. The responsibility encompasses collection, transport, and treatment. The responsibility is regulated by the Environmental Code, the Waste Collection and

Disposal Ordinance, and the Municipal Waste Regulation Ordinance.

Households are responsible for separating hazardous waste from other household waste. Most local authorities have regulated this obligation in the Regulation Ordinance for a long time.

At a national level, Sweden lacks a follow-up system for hazardous waste from industries and other types of businesses. No precise statistics are available for the amounts of hazardous waste from industries, but according to official Swedish waste statistics, reported to the EU by the Swedish Environmental Protection Agency, Swedish households and enterprises produced 2.3 million tons of hazardous waste in 2008, including scrap vehicles, electrical waste etc. Households accounted for 15 percent of hazardous waste generated in Sweden in 2008.

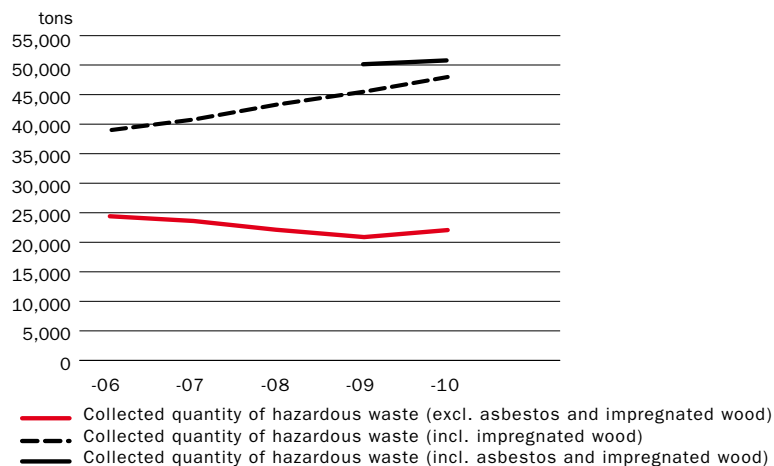
The most common collection system for hazardous household waste is through drop off at manned municipal recycling centers. Several municipalities have stopped using the unmanned recycling stations and have instead introduced some form of curbside collection. Approximately one third of all municipalities in Sweden offer curbside collection, often in combination with several other collection systems.

Hazardous waste dropped off at collection or treatment facilities often require pre-treatment to facilitate further treatment. Since hazardous waste may contain substances which are to be phased out of the ecocycle, the treatment often aims at destroying these substances. Substances that cannot be rendered harmless or reused will be disposed to landfills. In these cases it is important that the

waste is chemically and physically stable so hazardous substances do not leak out to surrounding areas.

New treatment methods for recycling hazardous waste have been developed, which involve the separation of hazardous substances and recycling of the remaining parts. The method is used for treatment of, for instance, paint tins and oil filters. Toxic and poorly degradable substances, such as pesticides and other hazardous chemical waste, are incinerated in specialized furnaces at high temperatures. Contaminated soil can be decontaminated through biodegradation. Impregnated wood contains ecologically harmful substances such as arsenic, creosote, and copper. Collected wood is chipped and incinerated in specially licensed Waste-to-Energy plants.

Collected quantity of hazardous waste 2006–2010



Source: Avfall Web/Avfall Sverige - Swedish Waste Management 2011

BATTERIES

A new producer responsibility for batteries came into effect on January 1, 2009. It made battery producers responsible for collection, treatment, recycling, and disposal of all batteries regardless of when they appeared on the market. Producers are also responsible for running nationwide information activities. El-Kretsen manages collection of portable batteries in about 70 percent of municipalities, while the remaining municipalities manage collection in exchange for an agreed compensation from El-Kretsen.

In 2010, 2,260 tons of portable batteries and 490 tons of built-in batteries were collected, on average 290 grams per Swedish resident. This represents an increase of 60

percent compared with 2009, but a large part of the increase depends on a time lag in the report from the municipalities in conjunction with new agreements with the producers.

In 2010, 7,000 tons of car batteries, an average of 0.7 kg per resident, were collected – a 30 percent increase compared with the previous year.

All collected batteries are taken care of and separated based on chemical content before being sent to recovery or disposal:

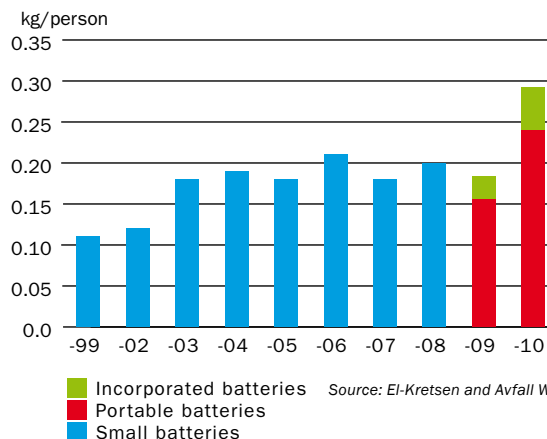
- Car batteries are sent to recycling and the lead is re-used in new car batteries.
- Batteries containing nickel/cadmium are sent for treatment, where cadmium is recovered for so-called open nickel cadmium

batteries, which are used in industry. Nickel is recovered as well, but is sent to steel mills.

- Nickel metal hybrid batteries are recovered and nickel is returned to the ecocycle.
- Batteries containing mercury are sent for processing. Mercury should not be recovered. Therefore, work is under way to extract the mercury from batteries in order to take it out of circulation and dispose of it safely.
- Lithium batteries are taken care of to recover cobalt, which can be used for purposes such as an additive in the steel industry.

All batteries should be collected and recycled as far as possible.

COLLECTION OF SM ALL BATTERIES 1999-2010



WASTE FROM ELECTRICAL AND ELECTRONIC EQUIPMENT (WEEE)

In 2010, 143,830 tons of waste from electrical and electronic equipment (WEEE) were collected, which is an unchanged amount compared with 2009. An average of 15.3 kg of electronic waste was handed in per person in 2010, compared with 15.4 kg per person in 2009. The slight decrease in weight do not mean that the collection has decreased. The collected products are becoming smaller and weigh less, but are more numerous.

Since producer responsibility was implemented in Sweden regional governments and producers have cooperated in the management of WEEE. In 2001, Avfall Sverige – Swedish Waste Management, the Swedish Association of Local Authorities and Regions (SALAR), and the electrical producers' service company, El-Kretsen, created the “El-retur” system. Under this collaboration, the local authorities assume responsibility and receive compensation for collection of WEEE from households, while the producers are responsible for its treatment.

Collection of WEEE from households is primarily carried out at the manned municipal recycling centers, of which there are approximately 600 throughout the country. In some municipalities this is complemented by curbside collection. Avfall Sverige – Swedish Waste Management and El-Kretsen collaborate with several local authorities on different projects

to develop these collection systems. One such system is the collection of light bulbs and smaller electric and electronic waste into small containers, which are placed in stores and other public places. There are currently about 100 collection containers located all over Sweden.

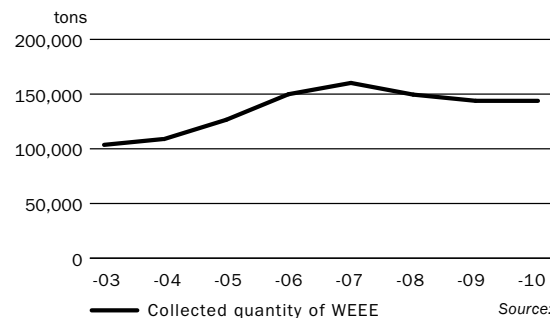
WEEE is pretreated through sorting and dismantling before it is sent on for further treatment. Pretreatment is carried out in certified facilities, and later forwarded to final treatment or recycling.

Components containing hazardous substances, i.e. hazardous waste, are treated in approved treatment facilities. Once the hazardous substances are removed, much can be recycled. Plastic casings are incinerated in Waste-to-Energy plants, and metal is recycled in smelting plants. 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 cards may contain gold and/or silver. Fluorescent tubes and low-energy bulbs contain mercury. These products are therefore separated and treated in a closed process. The fluorescent powder and mercury can be reused in new production of light sources. The glass is cleaned and reused in glass jars and bottles.

Sometimes old electronic products are donated to other countries as charity, for what may seem to be a good cause, but is not environmentally friendly. From an environmental point of view, it is better to have these products recycled in Sweden, where we have methods to treat such waste in an environmentally sound way.

COLLECTED QUANTITY OF WEEE 2003-2010



Source: El-Kretsen

MATERIAL RECYCLING

Material recycling including biological recycling and in total accounted for 2,146,770 tons in 2010. The Swedish Parliament has set the goal of having at least 50 percent of household waste going to material recycling, including biological treatment, by 2010. The goal was essentially reached: material recycling including biological recycling reached 49.2 percent in 2010.

The part of material recycling that includes electronic waste, refrigeration units, batteries and bulky waste collected as metal fraction in municipal recycling centers was 312,630 tons, or 33.2 kg per person.

Metal from households, such as bicycles and garden furniture, discarded at recycling centers decreased somewhat. In 2010 159,050 tons of metal were dropped off for recycling, or 16.9 kg per person.

Packaging and paper are mainly collected through some 5,800 unmanned recycling stations that the producers run. However, these

items can also be collected at the manned municipal recycling centers and about thirty municipalities have implemented curbside collection of packaging and paper from single-family homes.

The statistics for Packaging and paper recycling for 2010 will not be reported until 2012 because the method for reporting statistics is currently under review. As a result amounts collected are only reported here. The figures in the table are therefore not comparable with previous years.

Avfall Sverige – Swedish Waste Management is running a national campaign on material recycling in 2010-2011. The campaign is arranged in cooperation with the Swedish municipalities. The objective of the campaign is to increase knowledge about material recycling and improve confidence in the municipalities' work on this matter.



MATERIAL RECYCLING 2010

	[tons]	[kg/person]
Office paper	132,000	14.0
WEEE	117,100	12.4
Refrigeration units	26,730	2.8
Portable batteries	2,750	0.3
Car batteries	7,000	0.7
Metal from household waste	159,050	16.9

Source: Avfall Sverige – Swedish Waste Management, El-kretsen and Svensk Returpappersförening

COLLECTION RESULTS 2010 PACKAGING AND PAPER HOUSEHOLD

	[tons]	[kg/person]
Newspaper	396,300	42.1
Cardboard packages	111,860	11.9
Metal packages	15,820	1.7
Plastic packages	41,150	4.4
Glass packages	176,820	18.8

Source: Förpacknings- och tidningsinsamlingen (FTI)

To calculate total waste volume, amount per capita was multiplied by number of residents on December 31, 2010; taken from Statistics Sweden
FTI only reported collection results for 2010, not recycling results. Figures are therefore not comparable with previous years.

MATERIAL RECYCLING HOUSEHOLD 2006-2010 (TONS)

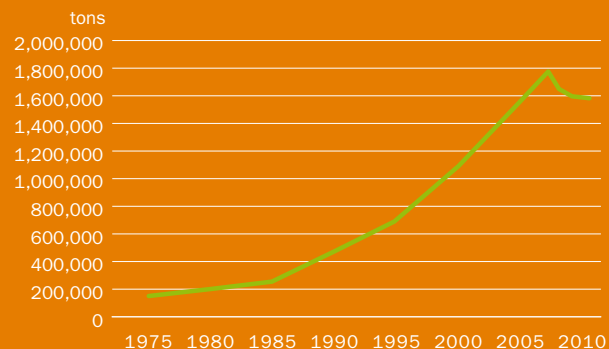
	2006	2007	2008	2009	2010
Newspaper	483,000	474,000	459,000	420,000	-
Office paper	153,000	164,000	156,000	118,000	132,000
Cardboard packages	486,790	504,000	482,000	479,700	-
Metal packages	33,700	35,300	32,660	33,400	-
Plastic packages	42,130	49,120	50,310	44,430	-
Glass packages	159,000	171,100	174,170	177,300	-
WEEE	121,900	129,700	122,900	117,770	117,100
Refrigeration units	28,000	30,500	28,800	26,080	26,730
Batteries					9,750
Metal from household waste	150,000	180,000	152,000	169,920	159,050
Total	1,657,520	1,737,720	1,657,840	1,586,600	1,559,600
Kg per person	181.9	189.2	179.1	169.9	165.6

Batteries includes portable batteries and car batteries

Batteries are included in the recycling statistics beginning in 2010

Source: Avfall Sverige – Swedish Waste Management, El-kretsen and Svensk Returpappersförening

MATERIAL RECYCLING HOUSEHOLD



BIOLOGICAL TREATMENT

In 2010, 587,170 tons of household waste was biologically recycled through anaerobic digestion or composting. Which is a decrease of 4.9 percent compared with 2009. A total of 62.4 kg of waste – green waste and food waste – was biologically treated in 2010. Biological treatment now accounts for 13.5 percent of the total quantity of treated household waste. One explanation for this reduction may be that branches and large twigs now go to Waste-to-Energy instead of to composting, which is considered to be better from the standpoint of resources and the environment.

Collection and treatment of source-separated food waste increased by 20 percent in 2010 compared with 2009. According to a survey that Avfall Sverige – Swedish Waste Management carried out, 163 municipalities collect source-separated food waste. About 20 of them only collect food waste from restaurants and large-scale kitchens, while the remaining municipalities have systems for households as well. The survey also shows

that an additional 70 municipalities are planning to introduce systems for source-separation of food waste.

According to Avfall Sverige – Swedish Waste Management's calculations, an estimated 24 percent of food waste was biologically treated in 2010. Household waste analyses show that a single-family home produces about 90 kg of food waste per person annually. The figure for apartment block residents is higher, about 100 kg. Food waste is also collected from sources such as schools and restaurants.³ Food waste mainly consist of fruit and vegetable residues, but a compilation from the National Food Administration shows that a large part is also fully edible food, more than 50 kilo per person annually. Between 10 and 20 percent of all purchased food is discarded completely unnecessarily, since it could have been eaten if it had been treated differently, according to the study.

The most common collection system for source-separated food waste from single-fam-

ily homes uses two separate bins, one for food waste and one for combustible waste. A multi-compartment system is also available in which different fractions are separated into separate containers. Another collection system sometimes used, is optic sorting of different colored bags that are put into the same container.

Through anaerobic digestion of biological waste, biogas, consisting of methane and carbon dioxide, is produced. Biogas is renewable and can be used, after upgrading, as an environmentally sound vehicle fuel or for heating. The biogas produced from waste, corresponds with over 30 million liters of petrol/gasoline.

Anaerobic digestion also produces digestate, which is an excellent fertilizer with a high nutrient content. The Swedish organic label "KRAV" and the Swedish Seal of Quality "Svenskt Sigill Kvalitetsråd" approve digestate based on source-separated food waste, which is certified in accordance with Avfall Sverige – Swedish Waste Management's system. Using digestate instead of mineral fertilizer

³ Avfall Sverige 2006:07 "Matavfall från restauranger, storkök och butiker – nyckeltal med användarhandledning"



returns nutrients to the soil, including phosphorus, which is a finite resource.

Compost is primarily used for soil improvement or in soil mixtures.

Facilities that produce compost or digestate from separated bio-waste, including food waste from the food industry, can undergo certification to use quality labels on their product.

Avfall Sverige – Swedish Waste Management developed the certification system about ten years ago in consultation with the food and agriculture industry, compost and digestate

manufacturers, soil manufacturers, authorities and researchers. SP Technical Research Institute of Sweden is the inspection body of this certification system.

Certification places requirements on the entire waste management chain, from incoming waste to final product. Eleven biogas plants – Bjuv, Falkenberg, Helsingborg, Kalmar, Kristianstad, Laholm, Linköping, Norrköping, Uppsala, Västerås, and Vänersborg – as well as three composting plants – Borlänge, Malmö, and Örebro – have obtained certificates.

Avfall Sverige – Swedish Waste Management engaged in a voluntary initiative to minimize emissions from biogas and upgrading plants. Air emissions may arise from different stages of biological treatment through anaerobic digestion of organic material and in biogas upgrading processes in treatment plants.

Even though the emissions from biogas plants are low, they should be minimized for several reasons. Approximately 30 biogas and upgrading plants have signed up for the voluntary undertaking.

Ton	2006	2007	2008	2009	2010
Anaerobic digestion	283,730	356,090	405,580	535,930	661,620
Composting	452,390	515,290	568,700	630,500	566,210
Total biologic treatment	736,120	871,380	974,280	1,166,430	1,229,840
food waste	134,990	166,810	162,680	178,770	214,230
Total quantity of household waste treated biologically*	469,880	561,300	597,280	617,680	587,170*
Digestate (tons)	272,730	336,100	389,350	498,720	582,750
Raw gas (MWh)	181,270	228,810	280,000	317,440	328,110
Vehicle gas (MWh)	106,430	149,230	204,720	262,600	264,680
Electricity (MWh)	1,680	1,230	700	0	0
Heating (MWh)	63,600	67,960	48,740	41,280	50,980
Total (MWh)	181,270	218,410	254,160	303,870	315,660

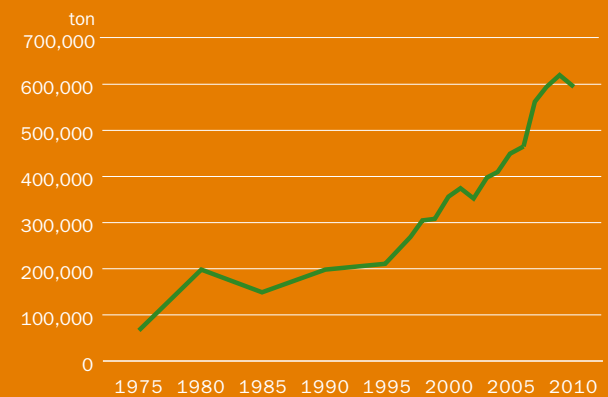
* Includes 60,000 tons of home compost.



Composting	Total (tons)	household waste
Ale	1,830	420
Alingsås	1,820	1,820
Borlänge	11,260	10,660
Borås	1,800	1,800
Eslöv	11,340	11,340
Fagersta	3,670	630
Gällivare	9,150	4,920
Gävle	12,780	12,780
Göteborg	29,400	23,280
Halmstad	23,000	6,280
Helsingborg	19,960	19,960
Huddinge	16,110	16,110
Hässleholm	9,420	8,330
Karlshamn	11,220	8,920
Karlskrona	7,500	7,240
Karlstad	51,090	300
Klippan	5,150	4,070
Kristianstad	15,000	13,000
Kristinehamn	14,980	0
Kungsbacka	6,410	1,900
Landskrona	5,650	2,720
Ludvika	9,770	5,580
Luleå	11,410	11,410
Malmö	27,800	27,800
Mariestad	1,570	0
Motala	6,600	3,300
Norrköping	1,510	1,510
Sala	8,850	5,410
Simrishamn	4,600	4,600
Söderhamn	5,600	800
Södertälje	9,000	6,000
Tranås	1,880	250
Trelleborg	5,900	5,900
Täby	20,250	6,900
Uppsala	15,800	14,850
Västerås	10,000	10,000
Växjö	5,200	5,200
Ystad	7,500	7,500
Örebro	14,000	12,040
Östersund	11,740	11,650
Total	447,520	297,180
Other plants	118,690	118,690
Sweden	566,210	415,870

Anaerobic digestion	Total (tons)	household waste
Bjuv	57,000	0
Boden	22,900	2,300
Borås	30,600	22,600
Eskilstuna	75,630	6,630
Falkenberg	94,060	0
Falköping	28,670	2,280
Helsingborg	54,110	15,240
Huddinge	830	770
Jönköping	13,360	8,210
Kalmar	28,670	0
Kristianstad	90,420	15,180
Laholm	58,740	1,090
Linköping	47,500	0
Norrköping	15,600	0
Skellefteå	6,620	5,090
Uppsala	7,540	6,280
Vänersborg	12,410	11,870
Västerås	16,960	14,980
Total	661,620	112,520

BIOLOGICAL TREATMENT 1975 - 2010



WASTE-TO-ENERGY

In 2010, 2,123,680 tons of household waste were treated by incineration with energy recovery – Waste-to-Energy. This was a reduction of close to 50,000 tons compared with 2009. If divided over the Swedish population, 225.5 kg of household waste per person was incinerated last year. Waste-to-Energy accounts for 48.7 percent of the total quantity of treated household waste.

Waste has become an increasingly important source in Swedish district heating systems. In total, 14.4 GWh of energy was produced through incineration, of which 12.6 GWh was used for heating and 1.8 GWh for electricity. A study on European Waste-to-Energy production shows that Sweden has the highest rate of energy recovery from waste incineration.⁴

In addition to household waste, 2,977,000 tons of other waste was also treated, primarily industrial waste. The statistical information mainly refers to plants treating household waste. Energy recovery also takes place in

plants where household waste is not treated, but there is no comprehensive data on total energy produced by incineration of waste in Sweden.

The remains from incineration consist of bottom ash from the furnace, 15–20 percent by weight of the treated waste, and flue gas treatment residues, 3–5 percent by weight. Some of the bottom ash goes to landfills, while slag gravel may be used as substitute to natural gravel in, for example, road and landfill construction work.

Flue gas treatment residues are either transported to landfills or used for neutralization when refilling mines.

There are 30 plants for incineration of household waste in Sweden, which will continue to expand in 2011.

Imported waste used for energy recovery has increased in recent years.

In 2010, Sweden imported 104,000 tons of household waste. Total imports of waste for energy recovery was 748,000 tons. Avfall

Sverige – Swedish Waste Management and Swedish District Heating Association have carried out a study that indicates a decline in greenhouse gas emissions as a result of imports.⁵ The main reason for the large emission reduction is that imports replace waste treatment in the country of origin, especially landfilling, which entails a considerable reduction of emissions of the greenhouse gas methane. Waste transports provide only a marginal addition of greenhouse gases in this context, according to the survey.

According to the EU Framework Directive on Waste, waste incineration with effective energy recovery is regarded as recycling. It is a sanitary and environmentally sound treatment method of such waste which cannot or should not be treated otherwise.

Swedish waste incineration plants more than comply with the so-called energy criterion in the EU Framework Directive on Waste, which is a requirement to be considered a recovery operation.

4 U 2009:05 Energy from waste – An international perspective

5 U 2009:18 Energy from waste – Potential contribution to EU renewable energy and CO₂ reduction targets

Municipality	Plant	Processed waste (tons)		Waste to Energy (MWh)	
		Household waste	Total	Heat	Electricity
Avesta	Källhagsverket	16,200	54,430	175,710	0
Boden	Bodens Värmeverk	33,330	95,170	246,670	28,010
Bollnäs	Säverstaverket	40,430	51,130	137,570	0
Borlänge	Fjärrvärmeverket, Bäckelund	43,560	90,960	203,320	33,380
Borås	Ryaverket	26,280	105,870	226,700	49,700
Eda	Åmotsfors Energi	20,700	59,790	148,270	12,600
Eksjö	Eksjö Energi AB	20,520	50,710	95,300	15,310
Finspång	FTV Värmeverket	21,600	27,140	59,700	0
Göteborg	Sävenäs avfallskraftvärmeverk	251,890	539,120	1,440,620	220,930
Halmstad	Kristineheds avfallsvärmeverk	100,490	185,700	452,080	61,230
Hässleholm	Beleverket i Hässleholm	15,020	48,550	113,350	5,820
Jönköping	Kraftvärmeverket Torsvik	40,830	158,440	368,460	103,460
Karlskoga	Karlskoga Kraftvärmeverk	37,980	86,340	245,690	42,890
Karlstad	Avfallsvärmeverket på Heden	35,670	48,390	152,050	0
Kil	Kils Avfallsförbränningsanläggning	0	14,830	44,300	0
Kiruna	Kiruna Värmeverk	6,190	66,000	163,690	30,970
Kumla	SAKAB Förbränning	39,970	155,550	240,620	58,620
Köping	Norsa avfallsförbränningsanläggning	24,520	28,670	66,700	0
Lidköping	PC Filen	32,530	93,510	281,890	21,040
Linköping	Gärstadverket	130,900	393,650	949,630	110,340
Ljungby	Ljungby Energi AB	47,720	57,300	148,960	15,200
Malmö	Sysav förbränningsanläggning	193,870	549,370	1,339,500	241,620
Mora	Avfallsförbränningen Mora	8,410	10,050	28,200	0
Norrköping	E.ON Händelöverket	124,430	246,000	630,100	25,900
Skövde	Värmekällan	28,130	60,380	165,400	12,210
Stockholm	Högdalenverket	401,700	680,740	1,432,600	339,400
Sundsvall	Korsta kraftvärmeverk	97,800	213,100	468,000	85,000
Södertälje	Söderenergi	0	272,320	879,030	85,220
Uddevalla	Lillesjö Avfallskraftvärmeverk	54,120	104,680	203,160	57,060
Umeå	Dåva kraftvärmeverk	55,810	149,560	344,140	80,860
Uppsala	Vattenfall AB Värme Uppsala	159,850	354,210	1,050,990	44,850
Västervik	Stegholmsverket	13,230	48,710	129,500	0
Total		2,123,680	5,100,370	12,631,900	1,781,620

Avfall Sverige – Swedish Waste Management statistics encompass Waste-to-Energy plants for household waste. Most plants also accept other waste.

The plants in Södertälje and Kil are included despite this definition.

Volume of household waste only includes household waste from Sweden

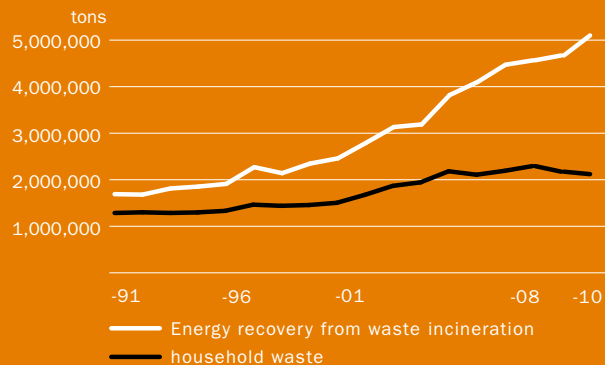
Total waste volume also includes imported waste.

The figures presented above include energy from back-up fuels. The amount of back-up fuel was 150,850 MWh in total.

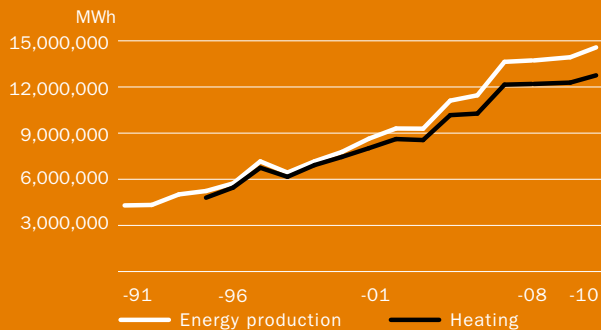
Waste to Energy and emissions	2006	2007	2008	2009	2010
Incineration (tons)					
Household	2,107,860	2,190,980	2,292,970	2,173,000	2,123,680
Other waste	1,991,940	2,279,710	2,273,840	2,497,840	2,976,690
Total	4,099,800	4,470,690	4,566,810	4,670,840	5,100,370
Production (MWh)					
Heat	10,270,290	12,151,270	12,196,620	12,284,420	12,631,900
Electricity	1,187,390	1,482,750	1,527,600	1,647,850	1,781,620
Total	11,457,680	13,634,020	13,724,220	13,932,270	14,413,520
Air emissions (tons)					
Dust	33	24	30	37	20
HCl	55	60	39	35	49
SOx (SO ₂)	175	196	154	211	228
NOx (NO ₂)	2,180	2,101	2,190	2,350	2,360
Air emissions*					
Hg (kg)	39	36	44	58	58
Cd + Tl (kg)	15	6	136	15	6
Pb (kg)	54	51	136	170	180
Dioxin (g)	0.8	0.5	0.8	2.6	0.8
Slag. bottom ash (tons)	598,545	649,680	693,140	736,020	850,200
APC residues. fly ash (tons)	176,298	183,370	202,920	216,660	239,050

* the emission values are accounted for in accordance with the rules for waste incineration

WASTE TO ENERGY 1991 - 2010



ENERGY RECOVERY 1991 - 2010



LANDFILL

In 2010, 42,000 tons of household waste went to landfills. This is a reduction of 21,000 tons, or 33 percent, compared with 2009. Divided over the population, it represents 4.5 kg per person. It also means that 1.0 percent of household waste was landfilled. In 2010, a total of 1,271,000 tons of waste was deposited at the Swedish landfills for municipal waste, an increase of 240,000 tons compared with 2009.

Landfilling is the treatment method that is used for waste which cannot be treated otherwise, for instance tiles, porcelain ware and crushed concrete.

In 1994, Avfall Sverige - Swedish Waste Management started to collect statistics on household waste deposited to landfills. Since then, the amount of landfilled waste has decreased by 97 percent.

At modern landfill sites, waste disposal is only part of the business conducted. Most sites also attend to separation of waste materials going to treatment, to transport on to

recovery and recycling, and to energy recovery. Sometimes landfill sites also serve as temporary storage of large quantities of waste that fall under the producer's responsibility, such as paper, glass and waste fuel.

Plants also often treat biodegradable waste and contaminated soil.

Final capping of closed landfills and landfill cells can also take a long time. On December 31, 2008, much stricter EU regulations regarding landfilling took effect, and almost half of all landfill sites for municipal waste were closed. In 2010 household waste was landfilled at 76 waste management plants. Most of these landfill sites take non-hazardous waste. Landfills that are closed must be capped with a final cover. Together these landfills cover an estimated area of 25km², and the estimated total cost for final covering of the sites is about SEK 6 billion. Every year, approximately 6-8 million tons of material is used for the final covers of landfill sites. Natural material is not always available, and in many cases, residues,

such as contaminated soil, ashes, sludge etc., is used instead.

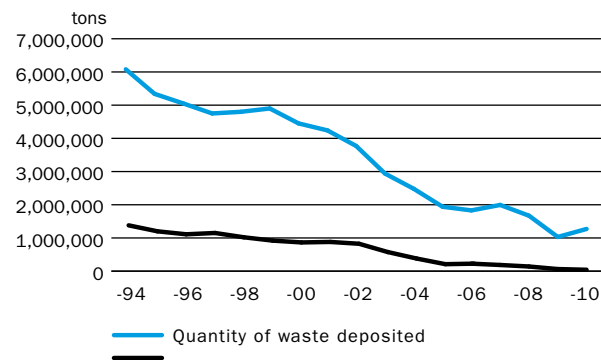
In 2010, approximately 300 GWh was produced from recovered landfill gas at 57 waste management plants, of which 262 GWh was used for energy. Energy recovery consisted of 20 GWh as electricity and 242 GWh as heat. In all, 37 GWh of landfill gas was flared. Energy is not produced from flaring, but methane emissions are reduced. Waste is still disposed to landfills at 40 plants.

In 2010, waste management plants that landfill waste treated almost 6 million cubic meters leachate, including polluted surface water from storage, separation and treatment areas. Dilution due to leakage of groundwater and surface water can also vary significantly at the different plants. More than 40 percent of plants state that leachate is diverted to municipal wastewater plants after various degrees of local treatment. Other plants state that leachate is treated locally.

LANDFILLED WASTE QUANTITY 1994 – 2010 (TONS)

	Landfilled waste quantity	household waste
1994	6,080,000	1,380,000
1995	5,340,000	1,200,000
1996	5,050,000	1,110,000
1997	4,750,000	1,150,000
1998	4,800,000	1,020,000
1999	4,900,000	920,000
2000	4,450,000	865,000
2001	4,240,000	880,000
2002	3,770,000	825,000
2003	2,940,000	575,000
2004	2,480,000	380,000
2005	1,940,000	210,000
2006	1,830,000	226,000
2007	1,994,000	186,000
2008	1,670,000	140,000
2009	1,030,000	63,000
2010	1,271,000	42,000

LANDFILLED WASTE QUANTITY 1994 – 2010



ENERGY RECOVERY AT LANDFILL SITES (MWH)

	2006	2007	2008	2009	2010
Energy recovery	282 200	290 100	310 800	294 240	262 200
electrical energy	20 800	22 600	23 700	17 400	20 400
Flaring	60 200	52 100	65 100	43 600	36 600

Source: Avfall Web/Avfall Sverige 2011.

WASTE ECONOMICS

Municipalities and producers handle the management of household waste. The municipal costs are charged as a separate waste collection fee, and the producers' costs as a fee included in the price of the product.

The local councils set the municipal waste collection fees and the producers decide on the amount of the product fee.

As a rule, waste collection fees cover the total costs for the municipal waste management, but deficits are tax-funded. Administration, such as waste planning, customer service, invoicing and information are included in the costs. The fee must also cover the service costs at the recycling centers for collection and handling of bulky waste and hazardous household waste. The rate is often based on one fixed and one variable fee, for example on one fee for waste collection and one for waste treatment. According to the self cost principle in the Local Government Act, the municipalities' income from fees must not exceed the costs for the municipal waste management.

The average annual waste collection fee of a Swedish single-family home is SEK 1,990, according to data from Avfall Sverige – Swedish Waste Management's statistics system Avfall Web. Apartment households pay an average of SEK 1,120 and the average fee for second homes is SEK 1,080 annually.

Many local authorities, which introduced

voluntary collection of food waste, use the fee as a means of control. Those who choose a food waste subscription may pay a lower fee than those who choose mixed waste.

To achieve a higher recycling rate, several municipalities have introduced a fee based on weight, which means that the households pay per kilogram of waste collected, on top of the basic fee. In 2010, 29 municipalities had implemented weight-based rates. In these cases, the collection vehicles are provided with a scale and equipment to identify each bin. The total annual cost for weight-based fees will vary depending on the quantity of waste left for collection. The fee varies between SEK 1.2-3.2 per kg for bins and bags, combined with different types of bin fees and fixed basic fee.

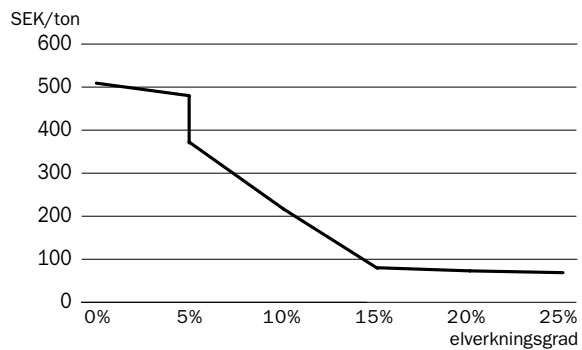
The cost for waste management is on average SEK 670 per person and year, excluding VAT. The municipal cost for collection of waste in bins and bags is on average SEK 190 per person and year. Treatment of the waste is not included in that cost. The basic fee of SEK 270 per person covers the cost for the recycling centers, treatment of hazardous waste from households, planning, information and administration. The statistics come from Avfall Web and are based on data from more than one third of Sweden's municipalities.

Several means are available to reduce the environmental impact of waste management,

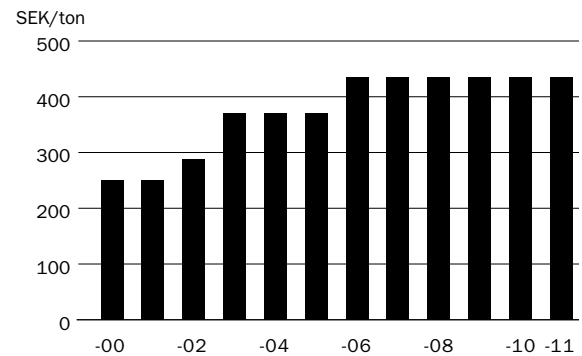
to improve resource efficiency and to increase recycling, either through information or with administrative means of control. Examples of administrative means are regulations and prohibitions such as emission limit values and prohibition against landfilling of organic waste. Economical means can work either as "carrot", through tax reliefs and subventions, or as "stick", through taxes and charges. The Polluter Pays Principle (PPP) is applied.

Tax on landfilled waste was introduced in 2000 as a way to reduce landfilling. The tax was initially SEK 250 per ton, but has been raised several times since then. Since July 1st 2006, the landfill tax has been set at SEK 435 per ton of waste disposed. The landfill site is liable for taxation. On July 1st 2006, a tax on household waste going to Waste-to-Energy incineration was introduced, which was then abolished on October 1, 2010. Treatment charges can vary a good deal from one facility to another. Some fees include transports, while other fees exclude them. The fees reflect what the municipalities have to pay. The trend for incineration is that fees per ton are decreasing. Many municipalities still have old agreements, however, where the reduction has not yet had an impact. Therefore the reduction is not yet evident in the average charges. The information is based on data from Avfall Web to which about half of the municipalities have contributed.

WASTE INCINERATION TAX



LANDFILL TAX 2000 - 2010



TREATMENT FEE FOR HOUSEHOLD WASTE (excluding VAT and, where relevant, including tax) 2010

SEK/ton	Anaerobic digestion	Composting	Incineration	Landfill
Average	515	540	640	800
Interval	350-800	250-750	450-850	550-1150

Source: Avfall Web/Avfall Sverige 2011

WASTE OTHER THAN HOUSEHOLD WASTE



The industries are responsible for managing the waste which is not household waste. Sometimes they have at their disposal their own landfill sites or the possibility of energy recovery in incineration facilities.

Waste from construction, renovation, reconstruction or demolition of buildings, or from more extensive landscaping projects do not fall under the responsibility of the municipality to collect or handle. Waste from minor maintenance work and house repairs counts as household waste. Some construction and demolition waste are classified as hazardous waste, for example asbestos and impregnated wood, and must be treated accordingly. Collected data on waste other than household waste is found in the official statistics presented to the EU by the Swedish Environmental Protection Agency.

According to the EU's Waste Statistics Directive, each member state must report its country's statistics once every two years. The most recent statistics were reported in 2010 and describe the situation in 2008, when about 98 million tons of waste were generated

in Sweden, including about 93 million tons of waste other than household waste in various activities, primarily the mining industry.

Of the total amount of waste, 76 percent was landfilled and 12 percent was recycled – including composting and anaerobic digestion. In all, 10 percent was used as fuel and 2 percent was released, such as leachate or dust from incineration. Mining waste comprises the majority of total waste quantities, more than 58 million tons. Excluding mining waste, the distribution is different:

- 42 percent recycled
- 37 percent used as fuel
- 15 percent disposed to landfills
- 6 percent released

In 2008, Sweden produced close to 95.6 million tons of non-hazardous waste and 2.3 million tons of hazardous waste. These figures include household waste.

The entire EU generates 3 billion tons of waste. Sweden accounts for a relatively large quantity of waste, because of the mining waste.

WASTE AGENDA

Major changes in laws, ordinances and regulations governing the waste industry.

1999

- The Environmental Code with associated directives and regulations.

2000

- Introduction of SEK 250/ton tax on waste going to landfill.
- Municipalities no longer have the option to take voluntary responsibility for waste other than household waste.

2001

- Directive with regulations about landfilling.
- Directives about producer responsibility for waste from electric and electronic equipment (WEEE).

2002

- Tax on waste to landfills increased to SEK 288/ton.
- Waste directive with new list of wastes.
- Landfilling ban on sorted combustible waste.
- Directives introduced regarding the incineration of waste. Applies directly to new facilities.

2003

- Tax on waste to landfills increased to SEK 370/ton
- Government bill 2002/03:117 "A society with non-toxic and resource-efficient ecocycles" is published. Parliament debate and vote on the government bill.

2004

- Clarification of the waste holder's responsibility introduced in chapter 15 § 5 a of the Environmental Code.
- Regulations and general advice about the management of combustible and organic waste.
- Changes to the directives regarding producer responsibility for packaging and waste paper.

2005

- Landfilling ban on organic waste.
- Swedish environmental objectives: The amount of waste to landfills, excluding mining waste, must be reduced by at least 50 percent compared with 1994. (According to the statistics, reached in 2003 for household waste.)

- New directive about producer responsibility for waste from electric and electronic equipment (WEEE) came into force on August 13. The previous directive continues to apply for light bulbs and light sources.
- Directive and regulation about waste incineration came into force on December 28.

2006

- Tax on household waste going to Waste-to-Energy incineration was introduced on July 1.
- Tax on waste to landfills increased to SEK 435/ton.
- New directives regarding requirements for receiving waste at landfill sites, and regulations on contents are laid down in a municipal waste plan.
- New EU directive 1013/2006 regarding transportation of waste comes into force.

2007

- Guidance on the concept of household waste from the Swedish Environmental Protection Agency.
- Introduction of increased environmental responsibility for operators, and increased legislation on environmental crime.
- The municipalities' possibility of taking voluntary responsibility for hazardous waste other than household waste is abolished on July 1.

- New directive regarding environmentally harmful activities and health protection with new permission and reporting levels in the appendix.

2008

- New legislation on public procurement takes effect on January 1 .
- All open landfill sites must follow ordinances and regulations for landfilling.
- Implementation of demands on pre-approved collection systems for packaging and certain types of paper such as newspaper, and on authorization requirements to run such collection systems professionally. The amendment is proposed to come into force on September 1.
- New Framework Directive for waste from the European Community.
- New EC regulation with directives regarding export to certain countries for recovery of waste.
- New EC regulation with directives regarding an embargo on export of mercury etc. from the EU.

2009

- New regulation regarding batteries takes effect on January 1.
- New regulation on waste from extractive industries. The directives concern waste from prospecting, extraction, processing activities or storage of mineral resources, and waste from quarry activities.

2010

- Incineration tax on household waste was repealed on October 1, 2010.
- New handbook from the Swedish Environmental Protection Agency about recycling of waste at facilities.
- A regulation revision authorizes the Swedish Environmental Protection Agency to negotiate agreements for less strict registration procedures for waste transports border districts between Sweden, Finland and Denmark.
- Revised definition of biogas to make it possible to have the definition include landfill gas. Tax exemption for biogas transported in pipe lines. The tax exemption shall apply for the gas all the way to the client according to agreement.
- Tax on fertilizer is abolished on January 1, 2010.

- The insurance on environmental damage and decontamination is abolished on January 1, 2010.
- New law on sustainability criteria for biofuels and bioliquids. Implementation of criteria in Directive 2009/28/EC.
- Revised regulations from the Swedish Environmental Protection Agency regarding large incineration plants and Waste-to-Energy incineration, respectively, amendments to NFS 2002:26 and NFS 2002:28.
- Revised regulations from the Swedish Environmental Protection Agency about demands for landfill sites for hazardous waste as well as landfill sites for non-hazardous waste to manage collection and report meteorological data, amendment to NFS 2004:10.
- National target to recycle a minimum of 35 percent of food waste from households, restaurants, large-scale kitchens, and stores through biological treatment by 2010.
- National target to recover a minimum of 50 percent of household waste through material recycling, including biological treatment by 2010.

- National target to recycle all food waste and equivalent waste from food industries etc., through biological treatment by 2010.
- The revised EU Framework Directive on Waste shall be taken into force no later than December 12 2010
- The new regulation (EC) 1069/2009 for animal by-products, shall apply from March 4, 2011.
- A new penal regulation for littering takes effect on July 1.
- New waste rules will come into force in Swedish law through changes in the Environmental Code chapter 15 (effective July 9) and a new Waste Collection and Disposal Ordinance (SFS 2011:927, effective August 10).

2013

- By December 12, at the latest, EU member states shall have established national waste prevention programs to reduce waste volumes and make the waste less harmful. The programs shall either be part of waste plans in accordance with the directive or of other environment policy programs. The requirements are laid down in the Waste Framework Directive 2008/98/EC.

2014

- Waste containing a minimum of 0.1 percent by weight of mercury and which is not land-filled in accordance with authorization given by the Environmental Code, or with regulations laid down in this code, will be disposed by means stated in the Waste Collection and Disposal Ordinance (with some exceptions given in the regulation (EC) 1108/2008).

2015

- By 2015, at the latest, the EU member states shall have established separate collection of at least paper, metal, plastic and glass provided that it is practicable from a technological, environmental and economical point of view. The requirements are laid down in the Waste Framework Directive.

2020

- The EU has the objective of reducing emissions of greenhouse gas by 20 percent by 2020, compared with the emission rates in 1990. The Swedish Parliament has called for a reduction of Sweden's emissions by 40 percent, compared with 1990. The overall target is to produce a total of 20 percent renewable energy within the EU and that 10 percent of all vehicle fuel shall be produced from renewable resources.
- The Waste Frame Directive includes new recycling objectives for the member states. By 2020, 50 percent of all paper, metal, plastic and glass household waste and similar waste shall be reused or recovered. For construction and demolition waste the target is 70 percent.

ABOUT AVFALL SVERIGE – SWEDISH WASTE MANAGEMENT

Avfall Sverige – Swedish Waste Management is the Swedish interest organization within the waste management and recycling sector. Our members are local authorities and local authorities' associations. Private companies are associated members. In total, we have approximately 400 members.

The primary task is to represent and develop members by creating networks, providing information, and influencing decision-makers.

Avfall Sverige – Swedish Waste Management is striving to promote the development of environmentally sound and sustainable waste management

based on a manifest responsibility to society.

“Zero Waste” – is Avfall Sverige – Swedish Waste Management's long-term vision with a target of 2020. Concrete goals are to break the relationship between waste and growth and to achieve clear, strong upward movement in the waste hierarchy. The municipalities are the driver in the transition towards the 2020 targets and the guarantee for the long-term vision. The municipalities are also the guarantee for long-term sustainable waste management for the public interest and for citizens.

Avfall Sverige – Swedish Waste Management

looks after the interests of its members in waste management, a task which encompasses separation, collection, recycling, waste disposal, as well as issues regarding administration, economy, information, planning, training, and development. We are Sweden's largest environmental movement. Our members make Swedish waste management work, with everything from collection to recycling.

We do it on behalf of society: environmentally safe, sustainable and for the long-term. We are 16,000 people working with Swedish households and companies – together, we perform one of Sweden's most important jobs!

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