

## **Stockholm, Sweden**

### **City Information**

**Population**

**Area (km<sup>2</sup>)**

**Climate**

**Main Economic Activities**

**City website**

### **Country Information**

**Population** 9 555 893

**Area (km<sup>2</sup>)** 449 964

**Economy and GNI/Capita** High-income economy

#### **Main Economic Activities**

Sweden is an export-oriented mixed economy. Timber, hydropower and iron ore constitute the resource base of an economy heavily oriented toward foreign trade. Sweden's engineering sector accounts for 50% of output and exports. Telecommunications, the automotive industry and the pharmaceutical industries are also of great importance.

**Website of National Government Agency responsible for guidance on waste legislation**

[www.naturvardsverket.se](http://www.naturvardsverket.se)

[www.swedishepa.se](http://www.swedishepa.se)

### **MSW Sector Overview: City Level**

#### **Classification of MSW**

(what waste types are classified as MSW, only households or also commercial entities like restaurants; hospitals etc.)

The concept “municipal waste” is not defined in Swedish legislation. According to praxis “municipal waste” is equal to household waste, as defined in the Environmental Code<sup>1</sup>:

“Household waste is waste generated by households, and similar wastes from other business and enterprises.”

The governmental bill, introducing the environmental code explained that “similar wastes” are wastes from industries, enterprises and other business that is generated as a direct consequence of that people, no matter of the purpose or activity, is staying within a premise or room. As examples can be mentioned waste from staff dining room, restaurant wastes and toilet wastes.

### **MSW Generation**

(total in tonnes/year and per capita in Kg/year)

### **Collection Coverage and Type**

(e.g. approximately 80% of the waste generated is formally collected and disposed. State if source segregated collection of different waste streams takes place or not, e.g. Publicly sited collection bins for paper & cardboard; glass and metals)

### **Waste Composition**

(Actual composition if known for organics; metals; plastics; glass; paper & cardboard etc. or a descriptive idea of the composition such as *“the waste stream has a high organic waste content estimated to be around 70% with low levels of recyclable materials such as plastics, paper and glass”*)

### **Waste Management Practice**

(identify what is predominant practice e.g. open dumps, no biological treatment or formal recycling; include disposal, recycling and recovery rates where known; type of materials reused, types of materials recycled; )

### **Formal Waste Sector**

(type of ownership and management e.g. publically owned and operated, PPP etc; outline the different waste operations in place locally e.g. landfill; composting plants; energy recovery; recycling and what waste types are exported for treatment, e.g. separated recyclables)

### **Informal Waste Sector**

(collection coverage, type of materials, if the informal sector makes up a large or small part of the waste sector)

### **Financing of MSW**

(what type of model is used to finance waste services e.g. through household fees, general tax, etc. Is the cost a significant part of the city budget?)

## **MSW Sector Overview: Country Level**

### **General description and overview of common practice**

(e.g. approximately 85% of waste generated is not collected and disposed of in a sanitary manner. Improper disposal methods include burning, household burying, and open dumping along streams and roads)

In 2012 quantities of MSW totaled 4 398 680 tonnes. 51.6% of the MSW was sent for energy recovery, 32.3% to material recovery and 15.3% to biological treatment (composting or anaerobic digestion). 0.7% of the MSW was landfilled in 2012.

The regulatory frameworks for European waste management are established by the EU. Based on these frameworks, Swedish Parliament (riksdag) decides how Swedish waste management should be structured. In the 2000s the riksdag and its environmental goals have steered Sweden towards greener waste management practices; a process in which the country's municipalities have played a key role.

There are a number of different systems for collecting and transporting household waste. Household waste in bins and bags can be collected either as a mixed fraction intended for waste-to-energy recovery or in separate fractions – one for food waste and one for combustible waste. Mixed combustible waste from single-family houses is mostly collected in 190-litre bins that are emptied every fortnight. There are also a number of different bag and bin sizes which are emptied at different intervals. Waste from apartment blocks is usually collected on a weekly basis. The most common collection system for source-separated food waste is in separate bins, one for food waste and one for combustible waste, by multi-compartment bin or by optical sorting. Optical sorting requires households to separate waste into different coloured bags that are placed in the same bins. The bags are transported by the waste collection vehicle to an optical sorting facility where they are separated automatically for appropriate treatment. Optical sorting has been introduced by several municipalities in the last few years.

Most municipalities provide curbside collection of packaging and newspaper from apartment blocks. Some 30 municipalities also provide the same service for single-family houses. Here, packaging and newspaper is commonly separated into two four-compartment bins which are collected at different intervals. One of the bins, which can be designated for food waste, combustible waste, paper packaging and colored glass, is emptied every fortnight. The other bin, which can be designated for clear glass, metal, plastic packaging or newspaper, is emptied every four or eight weeks. Traditional rear-loading vehicles are still the predominant waste collection vehicles, but the proportion of multi-compartment vehicles is growing and becoming more technically advanced. Side-loading vehicles account for a more steady proportion of the vehicle fleets. A growing number of vehicles use biogas as fuel, which municipalities can control through their procurement requirements. In addition, alternative fuels such as RME, and various hybrid technologies to reduce climate impact are also used.

At the manned municipal recycling centres, households can drop off bulky waste, electronic waste and hazardous waste. There are around **630 recycling centres** throughout the country which combined **receive about 20 million visits annually**. Bulky waste is household waste that is too heavy, too bulky or otherwise inappropriate for collection in bags or bins. In 2012, households dropped off 1.6 million tonnes of bulky waste, mostly at manned municipal recycling centres. A small proportion, about ten percent, was collected through curbside collection. Bulky waste accounted for a volume equivalent of 170 kg per person. The quantities of bulky waste and hazardous waste dropped off at recycling centres have increased significantly in recent years.

The producers' system of some **5,800 unmanned recycling stations** for handling packaging and newspaper is designed to cover the entire country's needs. Collection systems should be designed by the producers in consultation with municipalities. The recycling stations have separate containers for newspaper and different packaging materials.

**Waste Generation (per capita/year)** 460.3 kg/capita household waste (2012), 4 398 680 tonnes in total.

**Collection Coverage** 100%

(% of population receiving collection services)

**Number of Landfills/MSW Disposal rate (tonnes/year)**

In 2009 there were 157 active landfills in Sweden – 28 landfills for hazardous waste, 96 landfills for non-hazardous waste and 33 landfills for inert waste. 32 600 tonnes, or 0.7%, MSW were landfilled in 2012.

**Recycling Rate (if known)**

(ideally for different fractions: metals, glass, plastics, paper & cardboard. If no figures are available descriptive information can be given)

In total 32.3%, or 731 750 tonnes of the MSW went to material recovery in 2012.

The collected amounts of MSW for material recovery in 2012 were composed of

- Newsprint 358 070 tonnes (37.5 kg per person)
- Paper packaging 125 270 tonnes (13.1 kg per person)
- Metal packaging 15 760 tonnes (1.6 kg per person)
- Plastic packaging 49 390 tonnes (5.2 kg per person)
- Glass packaging 183 260 tonnes (19.2 kg per person)

**Waste management of Organic fraction (composting, anaerobic digestion)**

(Are practices like AD and composting in place and on what scale)

15.3% of the MSW, or 673 180 tonnes, was sent for biological treatment in 2012 (composting or anaerobic digestion). Out of this 428 330 tonnes of MSW were composted and 244 850 tonnes was sent for anaerobic digestion.

**Energy Recovery Rate**

(Mention if energy is recovered from waste, and if so by what means (landfill gas; anaerobic digestion; thermal treatment etc.) and from what quantities of waste, if known.)

In 2012 the electricity generation from waste was 1.7 TWh. Electricity production from landfill gas was 0.01 TWh. In 2012 the heat from waste incineration was 13 TWh and heat from landfill gas 0.2 TWh. An equivalent to 49 300 MWh of landfill gas were flared. A total of 5 042 020 tonnes of waste were incinerated, of which 2 270 650 tonnes were MSW. A total of 1 555 300 tonnes of waste was landfilled of which 32 600 tonnes were MSW.

Regarding energy production from biological treatment (composting or anaerobic digestion) an equivalent to 353 180 MWh was utilized as vehicle gas, 15 540 MWh used for heating and 25 640 MWh were flared.

## **Plans, Strategies, Policies (including financial instruments) and National Objectives**

## **City Level**

**Aimed at improving Waste Management in General**

**Aimed at addressing Climate change and reducing SLCPs through waste related activities**

## **Country Level**

**Aimed at improving Waste Management in General**

The national waste management plan for 2012-2017 named From waste management to resource efficiency was adapted in June 2012 and is available in English. The following areas are in focus in the current plan:

Waste management within the construction and engineering sector

- By 2020, preparation for reuse, recycling and other recovery of nonhazardous construction and demolition waste must be at least 70 percent by weight. (national interim target, which has been decided by the Government)
- The use of waste and materials in construction works that is safe from an environmental and health perspective shall increase.

Household waste

- The reuse of household waste shall increase, partly by making it easier for households to deliver materials and products for reuse or for preparation for reuse. A more precise target proposal will be submitted to the government by Naturvårdsverket by December 2013
- The reuse of textiles and recycling of textile waste shall increase. A more precise target proposal will be submitted to the government by Naturvårdsverket by December 2013.
- The recycling of household waste shall increase and at least 90 percent of households shall be satisfied with collections.
- The collection of electrical waste for recycling shall increase, particularly as regards small items of electrical waste.
- Litter generation shall decrease in urban areas, in natural areas and along coasts.

Resource efficiency in the food-chain

- Food waste shall decrease. A more precise target proposal will be submitted to the government by Naturvårdsverket by December 2013
- By 2018, at least 50 percent of food waste from households, institutional kitchens, shops and restaurants shall be sorted and processed biologically so that plant nutrients are utilized, with at least 40 percent being processed so that energy is also utilized. (national interim target, which has been decided by the government)

Waste treatment

- All end-of-life vehicles shall be delivered to authorized vehicle dismantlers and the decontamination and dismantling of end-of-life vehicles shall be improved.

- The risk of adverse environmental impacts from closed landfills shall decrease. All municipalities and county administrative boards shall have identified, listed and risk-classified all closed landfills.
- Facilities which incinerate waste shall continuously sample emissions of dioxins and furans.
- All waste shall be stored and subject to controls in such a way that fires at waste storage sites do not occur.

Illegal exports of waste

No illegal transportation of waste from Sweden occurs.

The **national waste prevention programme** has been sent out to stakeholders for comments. It will include targets, measures, policy tools and indicators for food waste, textiles, construction & demolition waste and waste from Electric and Electronic Equipment (WEEE). The programme will be finalized in December 2013.

**The environmental quality objectives** is the basis for environmental work & policy in Sweden. There are 16 environmental quality objectives, adopted by the Swedish Parliament in 1999. The EOs describe what quality and state of the environment are sustainable in the long term. There is an overall objective, called The Generational Goal:

“The overall goal of Swedish environmental policy is to hand over to the next generation a society in which the major environmental problems in Sweden have been solved, without increasing environmental and health problems outside Sweden’s borders.” Gov. Bill *Sweden’s Environmental Objectives – For More Effective Environmental Action* (2009/10:155). Waste management falls mainly under A Good Built Environment and is specified to mean that the aim is to ensure that:

10. waste management is efficient for society and easy for consumers to use, and waste is prevented, while the resources in waste produced are as far as possible made use of, and the impact of waste on and the risks it presents to health and the environment are minimised.

In May 2012, the Swedish government implemented a set of new objectives, two of which concern waste management.

- The objective of greater economisation of resources in the food chain requires the implementation by 2018 of measures to ensure that resource economisation in the food chain manifests itself by at least 50 percent of food waste from households, large-scale kitchens, stores and restaurants being separated and treated biologically to recover plant nutrients, and by at least 40 percent being treated to recover energy.
- The objective regarding construction and demolition waste requires the implementation by 2020 of measures aimed at ensuring that the preparation for reuse and material recycling and other material utilization of non-hazardous construction and demolition waste is at least 70 percent in weight.

#### **Aimed at addressing Climate change and reducing SLCPs through waste related activities**

See legislation below. When the focus areas for the national waste plan and the national waste prevention programme were decided, the effect on climate change from the management of the different waste fractions were studied in order to make the right prioritizations.

### **Legislation**

## City Level

Legislation governing MSW management

Guidance for MSW management (after legislation, before inspection activities)

Inspection activities/supervision and enforcement of legislation

## National Level

Legislation governing MSW management

- Legislation on municipal waste planning (1991)
- The Environmental Code (1999) and the waste ordinance (2001)
- Legislation on higher standards on incineration (2008) and landfilling (2001/2005)
- Producer responsibilities
  - packaging, paper/newsprint and tires (1994), WEEE (2001), End-of-life-vehicles (2007), batteries (2009)
- Landfill tax (2000)
- Landfill ban on combustible (2002) and organic waste (2005)

**The responsibilities for national and municipal waste management plans are regulated in the legislation. The goal for the national and local waste management plans are to** set up priorities, involve all actors, and develop plans adapted to local conditions, get acceptance for measures and political support. The first national waste plan was made in 1996. The regulations on municipal waste management plans came in to force in 1991. The local plans should comprise all waste, also that under producer responsibility, and measures to prevent it.

The waste policy and the existing instruments within the field of waste have effectively steered disposal away from landfill disposal towards greater energy recovery and recycling. The **Environmental Code's** general section and general rules of consideration form the basis for application of the EU's waste hierarchy. The 15<sup>th</sup> chapter of the Environmental Code contains specific regulations on waste handling. The Waste Ordinance regulates management and transports of waste as well as classification of waste as hazardous or non-hazardous. There are specific regulations on landfilling and incineration (according to EU-directives). Instruments to promote recycling in Swedish waste legislation primarily consist of **bans and taxes which discourage landfill disposal**. There are also requirements concerning the **sorting of combustible waste** which promote energy recovery. In addition to the legislation, there are also political objectives which promote the biological treatment of food waste. Economic instruments in the form of **government investment grants** are also a driving force and have been crucial for the development of the biogas sector.

The **producer responsibility** promotes sorting, collection and recycling of certain waste flows. A further aim of the producer responsibility is to reduce the amount of waste, but the effects of this are difficult to measure and the legislation has so far had a limited effect in this regard. It is also unclear as to how the producer Responsibility has encouraged producers to design products in a way which makes them easier to recover materials from.

Together with the expansion of district heating, **the tax on the landfill disposal of waste and the landfill ban** have resulted in a reduction in landfill disposal and an increase in energy recovery from waste.

The effects of the **landfill tax** are not unequivocally positive. Taxable landfill has undoubtedly reduced markedly, but it is uncertain how much virgin material has actually been replaced through the recovery

of materials. The landfill tax promotes the recovery of waste. In some cases, it is also not clear whether the landfill tax is promoting waste management which is best from an environmental perspective. When waste is used in new ways, considerable demands are placed on the resources of the inspection authorities to ensure that the use is appropriate from a resource perspective. Use of the waste could for example involve a risk of hazardous substances being dispersed.

In order to achieve a resource-efficient society, many different types of instruments and measures will probably be required. Future instruments need to do more to guide waste disposal towards the other areas of the hierarchy, towards the prevention of waste.

### **Guidance for MSW management (after legislation, before inspection activities)**

The Swedish EPA has issued guidance on for example:

- Landfilling of waste (available in English)
- Fact sheet on leachate from landfills (available in English)
- Criteria for the acceptance of waste at landfills
- Utilization of waste as a construction material
- Classification of waste as hazardous or non-hazardous
- Handling of hazardous waste
- Producer responsibility
- Transports of waste – national and across international borders
- Incineration of waste
- “General guidance” on handling of organic waste, composting and anaerobic digestion
- Handbook on storage, anaerobic digestion and composting of waste

### **Inspection activities/supervision and enforcement of legislation**

The environmental permits are issued by the Environmental Courts or the County Administrative Boards. For activities that have less environmental impact, but still poses risks to the environment, a notification is made to the municipalities.

The supervision is performed by the county administrative boards and the municipalities. There are 21 county administrative boards in Sweden and 290 municipalities. The purpose of the supervision is to ensure compliance with the objectives of the Swedish Environmental Code and rules related to the Code. The supervisory authority shall supervise compliance with the provisions of the Code and rules, judgements and other decisions issued in pursuance thereof and take any measures that are necessary to ensure that faults are corrected. General rules and principles in the Environmental Code apply to everybody. Both the supervisory authority and the operators have responsibilities according to the Code. The responsibilities for the supervisory authority is to monitor the status of the environment and identify the major environmental issues and evaluate the demand for supervision as well as to plan and allocate enough resources, staff and funds, for the supervision.

### **Involvement to date in CCAC MSW initiative**

#### **City**

The City of Stockholm has a city exchange with Viña del Mar in Chile.

#### **Country**

The Swedish EPA has an exchange with the Ministry of the Environment in Chile.

## **Current Projects or activities aimed at reducing SLCP Emissions**

### **City Level**

### **Country Level (and/or international)**

See information above about our national waste management plan and waste prevention programme.

## **Key Stakeholders**

Swedish EPA [www.naturvardsverket.se](http://www.naturvardsverket.se)

Swedish Waste Management and Recycling association <http://www.avfallsverige.se/in-english/>

The Swedish Recycling Industries' Association <http://www.recycling.se/english>

The Packaging and Newspaper Collection Service [www.ftiab.se/257.html](http://www.ftiab.se/257.html)

## **Useful web-links to additional information not included elsewhere**

**Towards Sustainable Waste Management** (an interdisciplinary research programme dedicated to investigating policy instruments and strategic decisions that can contribute to developing waste management in a more sustainable direction.) [www.sustainablewaste.info/](http://www.sustainablewaste.info/) In Sweden it is common to perform certification for the digestate and compost. There is some information about this available in English

[http://www.avfallsverige.se/fileadmin/uploads/Rapporter/Biologisk/English\\_summary\\_of\\_SPCR\\_120.pdf](http://www.avfallsverige.se/fileadmin/uploads/Rapporter/Biologisk/English_summary_of_SPCR_120.pdf)

[http://www.avfallsverige.se/fileadmin/uploads/Arbete/Biologisk\\_behandling\\_certifiering/SPCR120\\_-\\_engelska.pdf](http://www.avfallsverige.se/fileadmin/uploads/Arbete/Biologisk_behandling_certifiering/SPCR120_-_engelska.pdf) and <http://www.avfallsverige.se/fileadmin/uploads/Rapporter/Biologisk/B2009a.pdf>

## **Contacts**

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