SEPARATE

“Enabling market uptake of innovative separation and cleaning solutions for material recycling of all product groups contained in bio-wastes and MSW”

D.3.2

Country profiles

<table>
<thead>
<tr>
<th>Contract number</th>
<th>Instrument</th>
<th>CIP Eco-Innovation – First application and replication projects</th>
</tr>
</thead>
<tbody>
<tr>
<td>333021</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Start date</td>
<td>2013-09-01</td>
<td>Duration 24 months</td>
</tr>
<tr>
<td><strong>SEPARATE deliverable fact sheet</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>------------------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Project start date:</strong></td>
<td>01 September 2013</td>
<td></td>
</tr>
<tr>
<td><strong>Project duration:</strong></td>
<td>24 months</td>
<td></td>
</tr>
<tr>
<td><strong>Document</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Deliverable number:</strong></td>
<td>3.2</td>
<td></td>
</tr>
<tr>
<td><strong>Deliverable title:</strong></td>
<td>Country profiles</td>
<td></td>
</tr>
<tr>
<td><strong>Due date of deliverable:</strong></td>
<td>28.02.2014</td>
<td></td>
</tr>
<tr>
<td><strong>Actual submission date:</strong></td>
<td>30.04.2014</td>
<td></td>
</tr>
<tr>
<td><strong>Editors:</strong></td>
<td>Katharina Krell, Greenovate! sprl</td>
<td></td>
</tr>
<tr>
<td><strong>Authors:</strong></td>
<td>Ruska Kelevska, Greenovate! sprl; Heleen Muntinga, db technologies; Samantha Demaio and Ina Dimireva, Opportunity Peterborough (OP)</td>
<td></td>
</tr>
<tr>
<td><strong>Reviewers:</strong></td>
<td>Jan Bevelsborg, db technologies</td>
<td></td>
</tr>
<tr>
<td><strong>Participating beneficiaries:</strong></td>
<td>ALL</td>
<td></td>
</tr>
<tr>
<td><strong>Work Package no.:</strong></td>
<td>3</td>
<td></td>
</tr>
<tr>
<td><strong>Work Package title:</strong></td>
<td>Understanding market potential and risk</td>
<td></td>
</tr>
<tr>
<td><strong>Work Package leader:</strong></td>
<td>Greenovate! sprl</td>
<td></td>
</tr>
<tr>
<td><strong>Work Package participants:</strong></td>
<td>ALL</td>
<td></td>
</tr>
<tr>
<td><strong>Estimated person-months for deliverable:</strong></td>
<td>6</td>
<td></td>
</tr>
<tr>
<td><strong>Dissemination Level</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>CO (Confidential, only for members of the consortium including the Commission Services):</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>PU (Public):</strong></td>
<td>PU</td>
<td></td>
</tr>
<tr>
<td><strong>PP (Restricted to other programme participants, (including the Commission Services):</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>RE (Restricted to a group specified by the consortium including the Commission Services):</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Draft/Final:</strong></td>
<td>Final</td>
<td></td>
</tr>
<tr>
<td><strong>No of pages (including cover):</strong></td>
<td>131</td>
<td></td>
</tr>
<tr>
<td><strong>Keywords:</strong></td>
<td>Municipal waste, selective waste collection, composition, recycling, packaging waste, organic waste, landfill</td>
<td></td>
</tr>
</tbody>
</table>

Co-funded by the Eco-innovation Initiative of the European Union
# TABLE OF CONTENTS

**SUMMARY** ........................................................................................................................................ 4  
1. **BELGIUM (BE)** ................................................................................................................................. 5  
2. **BULGARIA (BG)** ............................................................................................................................... 9  
3. **CROATIA (CRO)** ............................................................................................................................ 13  
4. **CYPRUS (CY)** .................................................................................................................................. 16  
5. **CZECH REPUBLIC (CZ)** ................................................................................................................... 20  
6. **DENMARK (DK)** ................................................................................................................................ 23  
7. **ESTONIA (EE)** ............................................................................................................................... 26  
8. **FINLAND (FI)** .................................................................................................................................. 30  
9. **FRANCE (FR)** ................................................................................................................................... 33  
10. **GERMANY (DE)** .............................................................................................................................. 36  
11. **GREECE (GR)** .................................................................................................................................. 40  
12. **HUNGARY (HU)** ............................................................................................................................ 44  
13. **IRELAND (IE)** ................................................................................................................................... 49  
14. **ITALY (IT)** ...................................................................................................................................... 52  
15. **LATVIA (LV)** ................................................................................................................................... 57  
16. **LITHUANIA (LT)** ............................................................................................................................ 62  
17. **MONTENEGRO (ME)** ........................................................................................................................ 66  
18. **NETHERLANDS (NL)** ....................................................................................................................... 69  
19. **NORWAY (NO)** .................................................................................................................................. 73  
20. **POLAND (PL)** ................................................................................................................................... 77  
21. **PORTUGAL (PT)** .............................................................................................................................. 81  
22. **ROMANIA (RO)** ................................................................................................................................ 86  
23. **SERBIA (RS)** ..................................................................................................................................... 91  
24. **SLOVAK REPUBLIC (SK)** ............................................................................................................... 95  
25. **SLOVENIA (SI)** ................................................................................................................................ 100  
26. **SPAIN (ES)** ..................................................................................................................................... 104  
27. **SWEDEN (SE)** .................................................................................................................................. 109  
28. **SWITZERLAND (CH)** ...................................................................................................................... 114  
29. **TURKEY (TR)** ................................................................................................................................... 117  
30. **UNITED KINGDOM (UK)** ................................................................................................................ 122
Summary

The European market is not homogeneous and can be divided into five different areas due to individual systems for collecting and treating waste material, with different food and eating patterns of people living in these areas, and other cultural and industrial differences that influence the composition of waste.

The main aim of Work Package 3 “Understanding market potential and risk”, is to understand which countries in Europe are best-suited for the market uptake of DB TECHNOLOGIES BV sorting and cleaning solutions.

Suitability is a combination of actual market demand and the risk profile of a given market. For example, Italy has potentially good market demand, but the absence of a law ensuring that renewable electricity produced from organic waste will be bought makes the business model behind DB’s waste treatment concept rather risky. Other risk factors are mafia-like structures dominating the waste business in some countries.

This report presents the work that Greenovate! has carried out with support of DB TECHNOLOGIES BV and OP during the first six months of the project. 30 country profiles has been developed based on desk research, phone calling and evaluation of questionnaires sent to waste system operators (Deliverable 3.1). The country profiles cover general information, waste management practice, waste composition, legal framework, standards and norms.
1. Belgium (BE)

**General information**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Population (in millions):</td>
<td>11.2</td>
</tr>
<tr>
<td>Total amount of MW (kt)/ year:</td>
<td>5,125</td>
</tr>
<tr>
<td>Total amount of MW (kg)/ person:</td>
<td>464</td>
</tr>
<tr>
<td>Average income (GDP)/ capita in EUR:</td>
<td>34,000</td>
</tr>
</tbody>
</table>

**List of 15 largest cities:**

1. Brussels (Brussels Capital) (1,019,022)
2. Antwerp (Flanders) (459,805)
3. Ghent (Flanders) (231,493)
4. Charleroi (Wallonia) (200,132)
5. Liège (Wallonia) (182,597)
6. Bruges (Flanders) (116,709)
7. Namur (Wallonia) (106,284)
8. Leuven (Flanders) (92,892)
9. Mons (Wallonia) (91,277)
10. Aalst (Flanders) (77,534)

**Regions**

1. Brussels Capital Region
2. Flanders Region
3. Wallonia Region

1. Waste management practice

**Collection schemes in place for MSW:** In 2004, in Flanders, 71 % of household waste has been collected separately and only 4 % was landfilled.

Waste collection types in the three Belgium regions:

<table>
<thead>
<tr>
<th>Waste types (%)</th>
<th>Collection schemes</th>
<th>Kerbside Mixed</th>
<th>Kerbside Separate</th>
<th>Container parks</th>
<th>Recycling banks</th>
<th>Comments/references</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flanders</td>
<td></td>
<td>30</td>
<td>70</td>
<td>49.9</td>
<td>4.5</td>
<td>2005 data, household waste</td>
</tr>
<tr>
<td>Wallonia</td>
<td></td>
<td>32.4</td>
<td>13.3</td>
<td>49.9</td>
<td>4.5</td>
<td>2008 data, MSW(3)</td>
</tr>
<tr>
<td>BCR</td>
<td></td>
<td>78</td>
<td>22</td>
<td>22</td>
<td>22</td>
<td>2010 (4)</td>
</tr>
</tbody>
</table>

* % of the total collected MSW

**Separate collection of recyclables** *(paper, metal, plastic, glass):* A landfill ban and an incineration ban of selected waste streams have been in place since 1998.

**Separate collection of organic waste:** Flanders has introduced quality thresholds for separately collected waste (maximum 3 % contaminants for Vegetable, Fruit and Garden (VFG), green waste, cardboard and paper, 5 % for wood and glass waste, 15 % for construction and demolition waste and 5 to 15 % for textile waste).

**Waste treatment** *(dominating practices per country: recycling, landfiling, incineration) in % and tons/year:*

*Recycling* of municipal waste (2010): 40%
Incineration of municipal waste (2010): 37%. In Brussels region operates one incineration plant. As the amount of municipal waste to be incinerated has decreased progressively in the past years, rather overcapacity exists.

Composting of municipal waste (2010): 22%.

Landfilling of municipal waste (2010): 1%. In Wallonia: the landfilling rate has decreased drastically (386 446 tonnes landfilled in 2008, 55 387 tonnes of MSW disposed to landfill in 2010, equivalent to an 86 % reduction in 2 years). In comparison, reported data to Eurostat indicate 236 330 tonnes landfilled in 2008 and 208 610 tonnes in 2009, based on the latest reported year to Eurostat.¹

Municipal waste treatment in 2011:
- Municipal waste landfilled: 1%
- Municipal waste incinerated: 42%
- Municipal waste recycled: 36%
- Municipal waste composted: 20%

2. Waste composition

The Brussels Capital Region represents 9 % of the MSW generated in Belgium, Flanders represents 60 % of the MSW generated and Wallonia represents 31 % of the MSW generated (the total MSW generated in Belgium in 2010 is about 5 million tonnes).

3. Legal framework, standards and norms

Waste management plans (WMP) / waste prevention programmes (WMP) already adopted: ²

Brussels Capital Region:
- Adopted in (year): 2010 on a five year interval.
  [http://www.bruxellesenvironnement.be/uploadedFiles/Contenu_du_site/Professionnels/Formations_et_s%28C3%29minaires/Conf%C3%A9rence_Pre-waste_2011_%28actes%29/w-brusselsenvironment-wasteplanEN.pdf](http://www.bruxellesenvironnement.be/uploadedFiles/Contenu_du_site/Professionnels/Formations_et_s%28C3%29minaires/Conf%C3%A9rence_Pre-waste_2011_%28actes%29/w-brusselsenvironment-wasteplanEN.pdf) (in English)

Flanders Region:
- Waste Management Plan (1986-1990) - focused on closing down landfills, developing new ones with better standards, the maximum use of the existing incineration capacity and the separate collection of MSW. Landfill and incineration costs have been increased in order to promote waste separation and recycling.³
- Waste Management Plan (1991-1995) - specifically emphasised the separate collection of waste with the overall objective of waste prevention and material recovery.

- **Waste Management Plan (2008-2015)** - has four objectives: more environmentally beneficial consumption, no more than 560 kg of waste produced per capita per annum and no more than 150 kg of residual waste per capita per annum.

- **Title**: Implementation Plan for environmentally responsible household waste management (2008-2015)
- **Adopted in**: 2007

**Wallonia Region:**
- **Waste Management Plan (1991-1995)** - promoted waste prevention, material and energy recovery, separate collection of waste (kerbside collection, bring banks in streets and container parks) and optimisation of waste management technology.

- **Title**: Waste Plan Wallonia (Horizon 2010)
- **Adopted in**: 1998 until the new plan Horizon 2020 is adopted
- **Website**: http://environnement.wallonie.be/rapports/owd/pwd/index.htm

**Recovery/recycling rates achieved so far per waste stream** (at least paper, metal, plastic and glass): 4

Packaging Green Dot scheme: 80% recycling, and at least 90% recovery of the materials covered.

*Minimum recycling levels by material (2010):*
- Glass: 60% (household and industrial)
- Paper/cardboard: 60% (household and industrial)
- Drink cartons: 60% (household and industrial)
- Metal: 50% (household and industrial)
- Plastic: 30% (household and industrial)
- Wood: 15% (industrial)

*Minimum overall targets for recycling and recovery (2010):*
- Recycling: 80% (household); 80% (industrial)
- Recovery: 90% (household), 85% (industrial)

In **Wallonia**: the material recovery of MSW (material and organics) has increased significantly between 2000 and 2004 (49% increase).

The Cooperation Agreement between the 3 political regions sets the following targets: at least 80% recycling, and at least 90% recovery of the materials covered. According to FOST Plus, 2009 performance is 93% recycling and 96.5% recovery. This equates to 116kg/inhabitant/year collected.

**Note**: Recycling/recovery targets to be achieved by 2020: 50% (by weight) preparing for re-use and recycling of waste materials such as at least paper, metal, plastic and glass from households and other origins similar to households (Waste Framework Directive 2008/98/EC).
### Waste streams

<table>
<thead>
<tr>
<th>Waste streams</th>
<th>Recovery rate, 2001 (%)</th>
<th>Recycling rate, 2011 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total packaging waste:</td>
<td>96.6</td>
<td>80.2</td>
</tr>
<tr>
<td>Paper and board packaging:</td>
<td>96.8</td>
<td>90.4</td>
</tr>
<tr>
<td>Metal packaging:</td>
<td>97.4</td>
<td>97.4</td>
</tr>
<tr>
<td>Plastic packaging:</td>
<td>92.3</td>
<td>41.4</td>
</tr>
<tr>
<td>Glass packaging:</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

Source: Eurostat, 2011

### National bodies responsible for MSW management:
- Brussels Capital Region: Bruxelles Environnement (waste prevention and management policy) and Agence Bruxelles Propreté (municipal waste collection and treatment of waste)
- Flanders Region: the Public Waste Agency (OVAM) is responsible for waste management and soil clean-up
- Wallonia Region: the Walloon Waste Disposal Office is responsible for collecting waste to be disposed of or recycled
2. Bulgaria (BG)

General information

<table>
<thead>
<tr>
<th>Population (in millions):</th>
<th>7.3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total amount of MW (kt)/ year:</td>
<td>2,753</td>
</tr>
<tr>
<td>Total amount of MW (kg)/ person:</td>
<td>375</td>
</tr>
<tr>
<td>Average income (GDP)/ capita in EUR:</td>
<td>5,400</td>
</tr>
</tbody>
</table>

List of 15 largest cities:
(Indicate city & population, rank in order of size)

1. Sofia (1,270,284)
2. Plovdiv (331,796)
3. Varna (330,486)
4. Burgas (197,301)
5. Rousse (146,609)
6. Stara Zagora (136,363)
7. Pleven (106,011)
8. Sliven (89,848)
9. Dobrich (89,472)
10. Shumen (82,557)

1. Waste management practice

Collection schemes in place for MSW: Collection coverage for MW is 98.15%. In most of the cases the activities for collection and transportation of waste are performed by private operators, which are selected under Public Procurement Act. New obligation for separate collection of at least 4 material streams (paper and cardboard, plastics, metal and glass) from household and similar waste generation sources. Each municipality established its own scheme for collection and transportation of MSW (e.g. different collection frequency). In some urban area (e.g. Sofia) this is done 7 times per week; in other areas – 2-3 times per week; in rural areas the optimal schemes are with collection frequency 2-3 times per month.

Separate collection of recyclables (paper, metal, plastic, glass): There exist 9 authorized packaging waste collective (RO) (of which three have their permit recently revoked) and eight individual compliance schemes. To December 2011 there are 215 covered municipalities with 6,292,512 inhabitants in total, or 84 %. An increasing number of municipalities (also smaller) have signed contracts with the recycling operators. Typically, there are three collection bins for metal & plastic, paper and glass. Some of ROs apply scheme with 3 containers (blue – for paper and cardboards, green – for glass and yellow – for plastics and metals) or 2 containers (yellow – for all recyclable packaging’s except of glass and green – for glass). The frequency of collection and transportation of packaging waste depends on the collected quantities and the specific contact with the respective municipality.5

Separate collection of organic waste: There are no systems for separate collection of bio-waste.

Waste treatment (dominating practices per country: recycling, landfilling, incineration) in % and tons/year:

Landfilling: The amount of municipal waste deposited into landfills was 3 million tonnes in 2010, representing 98 % of the generated amount (3.1 million tonnes).

5 BiPRO (2012)
Municipal waste treatment in 2011:
- Municipal waste landfilled: 94 %
- Municipal waste incinerated: 0 %
- Municipal waste recycled: 3 %
- Municipal waste composted: 3 %

2. Waste composition

Composition of municipal solid waste (MSW): Paper/carton: 35%; Plastics: 30%; Glass: 22%; Wood: 7%; Metals: 4%; Other: 2%.

Figure 2.1: Composition of packaging waste generated in 2011, in %

Table 2.1 Composition of recycled packaging waste in 2004, 2006, 2008 and 2010 (in tonnes):

<table>
<thead>
<tr>
<th></th>
<th>2004</th>
<th>2006</th>
<th>2008</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total packaging waste recycling</td>
<td>100 610</td>
<td>129 129</td>
<td>152 057</td>
<td>197 958</td>
</tr>
<tr>
<td>Plastics</td>
<td>7 622</td>
<td>17 996</td>
<td>12 084</td>
<td>33 553</td>
</tr>
<tr>
<td>Paper/cardboard (including composites)</td>
<td>74 898</td>
<td>65 770</td>
<td>73 945</td>
<td>113 543</td>
</tr>
<tr>
<td>Metals</td>
<td>5 875</td>
<td>1 498</td>
<td>11 806</td>
<td>8 052</td>
</tr>
<tr>
<td>Wood</td>
<td>-</td>
<td>-</td>
<td>2 827</td>
<td>10 074</td>
</tr>
<tr>
<td>Glass</td>
<td>12 215</td>
<td>43 767</td>
<td>51 395</td>
<td>32 735</td>
</tr>
<tr>
<td>Other</td>
<td>-</td>
<td>98</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

3. Legal framework, standards and norms

Waste management plans (WMP) / waste prevention programmes (WPP) already adopted:

Title: National Waste Management Programme for 2009-2013 (Национална програма за управление на дейностите по отпадъците за периода)
Adopted in (year): 2008
Website: http://www.moew.government.bg/recent_doc/waste/NWMP_2009-2013_FINAL_doc

---

6 Bulgarian National Statistical Institute
Recovery/recycling rates achieved so far per waste stream (at least paper, metal, plastic and glass): 8

<table>
<thead>
<tr>
<th>Waste Streams</th>
<th>Recovery rate, 2001 (%)</th>
<th>Recycling rate, 2011 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total packaging waste:</td>
<td>65.6</td>
<td>65.1</td>
</tr>
<tr>
<td>Paper and board packaging:</td>
<td>98.2</td>
<td>98.1</td>
</tr>
<tr>
<td>Metal packaging:</td>
<td>69.9</td>
<td>69.9</td>
</tr>
<tr>
<td>Plastic packaging:</td>
<td>39.8</td>
<td>39.2</td>
</tr>
<tr>
<td>Glass packaging:</td>
<td>59.5</td>
<td>59.5</td>
</tr>
</tbody>
</table>

Source: Eurostat, 2011


In 2007, the landfilled amount was 1 400 000 tonnes, equivalent to 62 % of the generated amount in 1995. The amount of landfilled BMW increased by 8 % to 1 579 000 tonnes from 2007 to 2008. For 2010, the percentage of landfilled BMW is estimated to be 65 %, which is below the 2010 target of the Landfill Directive. Substantial efforts will have to be undertaken if Bulgaria shall fulfil the 50 % and 35 % diversion targets of the EU Landfill Directive by 2013 and 2020.

National strategy for the reduction of biodegradable waste going to landfills (due 16 July 2003):

Title: National Strategic Plan for diversion of the biodegradable waste going to landfill 2010-2020
Adopted in (year): 2010

---

8 Note: Recycling/recovery targets to be achieved by 2020: 50% (by weight) preparing for re-use and recycling of waste materials such as at least paper, metal, plastic and glass from households and other origins similar to households (Waste Framework Directive 2008/98/EC).

9 Note: Article 5(2) of the Landfill Directive 99/31/EC requires the reduction of biodegradable municipal waste going to landfills to:
   – 75% by 16 July 2006
   – 50% by 16 July 2009 and
   – 35% by 16 July 2016 calculated on the basis of the total amount of biodegradable municipal produced in 1995 or the latest year before 1995 for which standardised Eurostat data is available. Member States that landfilled more than 80 % of their municipal waste in 1995 may postpone each of the targets by a maximum of four years.
Under the strategic plan, there is a running project for the development of bio-waste regulations, establishment of a compost quality assurance system and a National Organization for Quality Assurance of compost. A first draft has been prepared: (i) Ordinance on separate collection on bio-waste and (ii) Ordinance on bio-waste biological treatment (compost).

The Bulgarian Ministry of Environment and Water have prepared a Draft Strategy for reduction of municipal biodegradable waste going to landfill. The Strategy focuses primarily on municipal waste, which is produced largely by households and commerce. Assessment of major options for the reduction of biodegradable waste constituents according the regional and structural frame conditions.

New regulation on financial instruments for waste disposal has been approved by the Minister of Environment and Water on 19 December 2013. The regulation aims to encourage waste recycling/re-use and to move away from landfilling.10

The municipalities are obliged to establish regional landfills to combine and share efforts for proper MSW treatment. They are also obliged to work together (e.g. in regional associations) in order to fulfill the recycling targets for biodegradable waste and packaging waste (paper, plastics, glass, metals).

National bodies responsible for MSW management:
- Ministry of Environment and Water (MoEW)
- Executive Environmental Agency (EEA)
- Regional Inspectorates of Environment and Water (16) – control and monitoring of the waste management
- Municipalities (264) - responsible for waste collection and waste management at local level

3. Croatia (CRO)

**General information**

<table>
<thead>
<tr>
<th>Population (in millions):</th>
<th>2.1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total amount of MW (kt)/ year:</td>
<td>1,645</td>
</tr>
<tr>
<td>Total amount of MW (kg)/ person:</td>
<td>373</td>
</tr>
<tr>
<td>Average income (GDP)/ capita in EUR:</td>
<td>10,300</td>
</tr>
</tbody>
</table>

List of 15 largest cities:

1. Zagreb (792,875)
2. Split (178,192)
3. Rijeka (128,735)
4. Osijek (107,784)
5. Zadar (75,082)
6. Velika Gorica (63,511)
7. Slavonski Brod (59,507)
8. Pula (57,765)
9. Karlovac (55,981)
10. Sisak (47,699)
11. Varaždin (47,055)
12. Šibenik (46,372)
13. Dubrovnik (42,641)
14. Bjelovar (40,443)
15. Kaštela (38,474)

1. Waste management practice

**Collection schemes in place for MSW:** Coverage of population and municipalities by organised municipal waste collection: 86% in 2004; 96% in 2010; quantitative target of 90% in 2015. Waste generated: 979,000 tonnes in 1995 and 1,630,000 tonnes in 2010. The level of MSW peaked in 2008 with 1,788,000 tonnes (Eurostat, 2010).

**Separate collection of recyclables (paper, metal, plastic, glass):** In 2010, the collection of packaging waste added up to 187,631 tonnes. The main part was paper and cardboard (124,476 tonnes) followed by glass (37,148 tonnes) and plastic (24,127 tonnes). A part of the collected packaging is collected in the business and service sector. However, some of the collected packaging waste is collected from households.

**Separate collection of organic waste:** The amount of separately collected types of municipal waste is continually growing and in 2010 it accounted for 14% (227,651 tonnes). The separated collected municipal waste adds up to 227,651 tonnes in 2010.

**Waste treatment** (dominating practices per country: recycling, landfilling, incineration) in % and tons/year:

Municipal solid waste (MSW): 11
- Landfilled: 61.7%
- Mechanical treatment: 29.3%
- Thermal treatment: 8.1%
- Biological and physicochemical treatment: 1%

---

11 Strategy of Waste Management in the Republic of Croatia, 2005
Municipal waste treatment in 2011:  
- Municipal waste landfilled: 92%  
- Municipal waste incinerated: 0%  
- Municipal waste recycled: 8%  
- Municipal waste composted: 1%

Most of the municipal waste is landfilled. Out of a total of 1,629,915 tonnes of municipal waste in 2010, 86% was mixed municipal waste (1,401,959 tonnes).

Organic recycling: 1% or 13,000 tonnes in 2010 and 12,487 tonnes in 2009.  
Material recycling: 3% or 53,000 tonnes in 2010.

The amount of recycled MSW is significantly lower than the amount of recycled packaging waste. In 2010, the collection of packaging waste added up to 187,631 tonnes. The main part was paper and cardboard (124,476 tonnes) followed by glass (37,148 tonnes) and plastic (24,127 tonnes). A part of the collected packaging is collected in the business and service sector. However, some of the collected packaging waste is collected from households. Assuming that 50% of the packaging waste is collected from households and could be added to municipal waste, the MSW recycling rate in 2010 would increase from 4% to 10%.

2. Waste composition

Composition of municipal solid waste (MSW): The separately collected municipal waste consisted mainly of bulky waste (38%), organic waste (20%), and paper (8%) in 2010.

![Figure 1: Separately collected types of municipal waste (Environmental Pollution Register, 2008)](image)

---

12 Eurostat Commission - STAT/13/33, 4 March 2013
13 Croatian Environment Agency
3. Legal framework, standards and norms

Waste management plans (WMP) / waste prevention programmes (WPP) already adopted: 14

title: Waste Management Strategy of the Republic of Croatia. The financing necessary for the realization of the Strategy over the next 20 years is estimated at Kn 24 billion (€ 3.25 billion).

*Adopted in (year):* 2005


Title: Waste Management Plan of the Republic of Croatia for 2007-2015. A priority is given to waste prevention, recycling, reuse and other types of recovery.

*Adopted in (year):* 2007

*Website:* [http://www.mzoip.hr/default.aspx?id=3967](http://www.mzoip.hr/default.aspx?id=3967)

Recovery/recycling rates achieved so far per waste stream (at least paper, metal, plastic and glass): 15 Taking into consideration the low level of recycling of municipal waste from 2007 to 2010 (2-4 %), Croatia would need to make an exceptional effort in order to fulfil the 50 % target of the Waste Framework Directive by 2020.

Reduction targets for biodegradable municipal waste achieved (2006, 2009, later): 16 In the accession negotiations with the EU for enlargement to Croatia it was agreed to use 1997 as the base year for Croatia. The 75 % reduction target has to be fulfilled in 2013 and the 50 % target in 2016. Croatia faces a huge challenge in order to reach the 2013 target to reduce BMW landfilled to 75% of BMW generated in 1997, mainly due to an increase of biodegradable municipal waste from 756 000 tonnes in 1997 to 1 012 651 tonnes in 2010. In 2010, 96 % was landfilled, 1.3 % composted while the rest (mainly paper and cardboard) was sent to other 9 recovery operations. With the current development, however, it seems impossible to reach this target for Croatia in 2013.

National strategy for the reduction of biodegradable waste going to landfills (due 16 July 2003): not available

National bodies responsible for MSW management:
- Ministry of Environment and Nature Protection
- Croatian Environment Agency (CAE): collect data from waste operators, works on methods of calculation of the recycling rates
- Municipal and Regional Governments

---


15 Note: Recycling/recovery targets to be achieved by 2020: 50% (by weight) preparing for re-use and recycling of waste materials such as at least paper, metal, plastic and glass from households and other origins similar to households (Waste Framework Directive 2008/98/EC).

16 Note: Article 5(2) of the Landfill Directive 99/31/EC requires the reduction of biodegradable municipal waste going to landfills to:
- 75% by 16 July 2006
- 50% by 16 July 2009 and
- 35% by 16 July 2016

Note: calculated on the basis of the total amount of biodegradable municipal produced in 1995 or the latest year before 1995 for which standardised Eurostat data is available. Member States that landfilled more than 80 % of their municipal waste in 1995 may postpone each of the targets by a maximum of four years.
4. Cyprus (CY)

**General information**

<table>
<thead>
<tr>
<th>Population (in millions):</th>
<th>0.9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quantity MSW (kt)/year:</td>
<td>611</td>
</tr>
<tr>
<td>MSW generated (kg)/person</td>
<td>760</td>
</tr>
<tr>
<td>Average income (GDP)/capita in EUR</td>
<td>23,500</td>
</tr>
</tbody>
</table>

**List of 15 largest cities:**

(Indicate city & population, rank in order of size)

<table>
<thead>
<tr>
<th>Districts</th>
<th>Main cities</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Nicosia (Lefkosia, capital) (326,980)</td>
<td>1. Lemesos (101,000)</td>
</tr>
<tr>
<td>2. Limassol (235,330)</td>
<td>2. Strovolos (67,904)</td>
</tr>
<tr>
<td>3. Larnaca (143,192)</td>
<td>3. Nicosia (Lefkosia) (55,014)</td>
</tr>
<tr>
<td>4. Paphos (88,276)</td>
<td>4. Larnaca (51,468)</td>
</tr>
<tr>
<td>5. Famagusta (Ammochostos) (46,629)</td>
<td>5. Lakatemeia (38,345)</td>
</tr>
</tbody>
</table>

1. Waste management practice

**Collection schemes in place for MSW:**

*Separate collection of recyclables (paper, metal, plastic, glass).*\(^{17, 18}\) Waste collected under Green Dot scheme (introduced in 2006) – based on “Fost-Plus” scheme (used in Belgium), glass collected in bins, plastics, metals and tetra pack – in specific bags (PMD bags) on door-to-door collection scheme. The system manages both household and commercial/industrial packaging. About 800 producers participated in Green Dot system during 2010. The Green Dot program currently involves municipalities of Nicosia, Limassol, Famagusta and Paphos districts, serving almost 50% of the population (Greek Cypriot).

*Separate collection of organic waste:* Municipal services are responsible for the collection of the MSW. They can either collect the MSW themselves and transport it off to specialised sorting plants or outsource it to other companies.

**Waste treatment** (dominating practices per country: recycling, landfilling, incineration) in % and tons/year:

*Landfilling:* The overriding option for MSW management is landfilling which takes up around 80% of the generated waste.

*Landfilling of biodegradable municipal waste (BMW):* Cyprus is landfilling a lot more biodegradable waste than generated in 1995, namely more than double. This is caused not only by the fact that landfilling is still the dominant treatment path in the country, but also by the large increase in BMW generation since 1995. The landfilled quantity was increasing until 2009, when organic waste recycling began.\(^2\)

---


Recycling of MSW:
In 2007: MSW recycled - 74.56 kt/y (12.7%). The total recycled MSW as a percentage of generated MSW doubled in the decade between 2001 and 2010, increasing from around 10 % to 20 %. In general, recycling in Cyprus is at a relatively low/medium level, but there is a very slow steady increase.

In 2010 the total recycled MSW is 20% (i.e. 121 000 t of MSW out of 611 000 t). The material recycling excluding compost – 15%. The organic recycling (compost and other biological treatment) – 4%. Between 2001 and 2009, recycling in Cyprus consisted only of materials other than organic waste and displayed only a minor increase (around 3 percentage points). Therefore, the big increase in performance in both organic and material recycling in 2010 could be a sign of an increased effort in Cyprus regarding MSW management. Cyprus is not expected to reach the Waste Framework Directive 50 % target in 2020.

Composting of MSW: Cyprus has not reported any composting of MSW before 2010. In 2010, 4 % of MSW was composted.

Municipal waste treatment in 2011:
- Municipal waste landfill: 80%
- Municipal waste incinerated: 0%
- Municipal waste recycled: 11%
- Municipal waste composted: 9% 19

2. Waste composition

Composition of municipal solid waste (MSW):

Figure 1: Composition of MSW in Nicosia (2005)

Source: 2007 Report on the state of the environment, Environment Service, MANRE

---

19 Eurostat Commission - STAT/13/33, 4 March 2013
3. Legal framework, standards and norms

Waste management plans (WMP) / waste prevention programmes (WPP) already adopted:

Title: ‘Strategic Plan for the Management of Solid and Hazardous Waste’


The strategy reflects the legislative targets (based on the Landfill Directive) and introduces a framework of standards on MSW management.

No waste prevention programme or information on economic or other instruments supporting the waste hierarchy has been found for Cyprus. It seems that Cyprus does not use any of the stronger policy instruments used in other countries to reduce landfilling of biodegradable municipal waste and to enhance recycling of MSW, such as landfill taxes or bans, introduction of mandatory separate collection, economic incentives for households to recycle or reduce waste. This could explain the very slow increase in MSW recycling.

Recovery/recycling rates achieved so far per waste stream (at least paper, metal, plastic and glass): 21

Targets set for the Green Dot scheme: 22

According also to the Law, until the 31st of December 2012 the Green Dot Company should accomplish the following quantitative targets for its shareholders and members:

- recover or incinerate in waste incineration facilities for energy recovery, at least 60% of the weight of packaging waste,
- recycle between 55% as a minimum and 80% as a maximum of the weight of the packaging waste, and
- recycle, the following materials that are included in packaging waste: (i) 60% of the weight of glass; (ii) 60% of the weight for paper and cardboard; (iii) 50% of the weight of metal; (iv) 22.5% of the weight of plastic, taking under consideration material which can be recycled into plastic; (v) 15% of the weight of wood.

In 2007 MSW recycled:

- Paper and cardboard - 10.21 kt/y
- Plastics - 2.40 kt/y
- Glass - 0.94 kt/y
- Metals - 57.03 kt/y
- Other - 3.98 kt/y

---

21 Note: Recycling/recovery targets to be achieved by 2020: 50% (by weight) preparing for re-use and recycling of waste materials such as at least paper, metal, plastic and glass from households and other origins similar to households (Waste Framework Directive 2008/98/EC).
<table>
<thead>
<tr>
<th>Waste streams</th>
<th>Recovery rate, 2001 (%)</th>
<th>Recycling rate, 2011 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total packaging waste</td>
<td>52</td>
<td>52</td>
</tr>
<tr>
<td>Paper and board packaging</td>
<td>88.4</td>
<td>88.3</td>
</tr>
<tr>
<td>Metal packaging</td>
<td>88.8</td>
<td>88.3</td>
</tr>
<tr>
<td>Plastic packaging</td>
<td>38.1</td>
<td>38</td>
</tr>
<tr>
<td>Glass packaging</td>
<td>33.8</td>
<td>33.8</td>
</tr>
</tbody>
</table>

Source: Eurostat, 2011


The target years for Cyprus are 2010, 2013 and 2020, since Cyprus has been granted a derogation period for the fulfilment of the Landfill Directive’s targets due to the fact that the country put more than 80 % of the collected municipal waste to landfill in 1995.

National strategy for the reduction of biodegradable waste going to landfills (due 16 July 2003):

A national strategic solid waste management plan has existed since 2002, which reflects the legislative targets (based on the Landfill Directive) and introduces a framework of standards on MSW management.

National bodies responsible for MSW management:

- Ministry of Interior (MOI): responsible for the overall management of domestic waste and the drafting of legislation and policy on waste.
- Ministry of Agriculture, Natural Resources and Environment (MANRE): The Environment Service (ES) of MANRE is responsible for a variety of waste related matters such as recycling, packaging waste and hazardous waste.
- Local authorities: Responsible for the collection, disposal and treatment of domestic waste and the operation of waste treatment facilities.

Note: Article 5(2) of the Landfill Directive 99/31/EC requires the reduction of biodegradable municipal waste going to landfills to:

- 75% by 16 July 2006
- 50% by 16 July 2009 and
- 35% by 16 July 2016

calculated on the basis of the total amount of biodegradable municipal produced in 1995 or the latest year before 1995 for which standardised Eurostat data is available. Member States that landfill more than 80 % of their municipal waste in 1995 may postpone each of the targets by a maximum of four years.
5. Czech Republic (CZ)

<table>
<thead>
<tr>
<th>General information</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Population</strong> (in millions):</td>
</tr>
<tr>
<td><strong>Total amount of MW (kt)/ year</strong>:</td>
</tr>
<tr>
<td><strong>Total amount of MW (kg)/ person</strong>:</td>
</tr>
<tr>
<td><strong>Average income (GDP)/ capita in EUR:</strong></td>
</tr>
</tbody>
</table>

| List of 15 largest cities : |
| (Indicate city & population, rank in order of size) |
| 1. Prague (1,241,664) |
| 2. Brno (385,913) |
| 3. Ostrava (299,622) |
| 4. Plzeň (170,322) |
| 5. Liberec (102,005) |
| 6. Olomouc (101,003) |
| 7. Ústí nad Labem (95,464) |
| 8. České Budějovice (96,053) |
| 9. Hradec Králové (93,490) |
| 10. Pardubice (89,552) |
| 11. Havířov (82,768) |
| 12. Zlín (75,660) |
| 13. Kladno (68,682) |
| 14. Most (67,058) |
| 15. Karviná (58,833) |

1. Waste management practice

**Collection schemes in place for MSW:** 100% collection coverage is ensured. In many cases mingled collection of all wastes is performed, in some cases mingled with industrial waste. Collection nationwide household-related solid waste collection, often collective container usage therefore often still mixed with industrial waste.

**Separate collection of recyclables (paper, metal, plastic, glass):** Door-to-door collection for mixed municipal waste (paper, plastic, glass, beverage cartons) and deposit-refund system for glass bottles (1950) are set up. For packaging waste Green Dot scheme is set up (2002) with a container solution (bring-systems); reduced working distance to containers and increased number of containers lead to a significant amount of separate collected and recycled packaging waste. Separate collection system operates in almost all towns and villages. A dual type of waste collection is used in Kladno: a bring-to-point system which is used for recyclable materials and a pick-up system (refuse collection) is used for residual (mixed) waste. 10-15% of municipalities (mostly smaller ones) implement PAYT (pay-as-you-throw) systems (either volume or frequency based).

**Separate collection of organic waste:** The separate collection of *bio-waste* is one priority in the new waste law and collection of *bio-waste* from households is expanding. There are hundreds of municipalities providing separate collection of bio-waste; but separation rate of bio-waste is not investigated. However, collection is not sufficiently popular amongst inhabitants. From 2014 on municipalities are obliged by law to introduce separate collection of *compostable municipal waste*. 
Waste treatment (dominating practices per country: recycling, landfilling, incineration) in % and tons/year: 24

Municipal waste landfilled: 65%  
Municipal waste incinerated: 18%  
Municipal waste recycled: 15%  
Municipal waste composted: 2%

2. Waste composition

Municipal mixed waste (paper, plastic, glass, beverage cartons) – 16,9% of all waste;  
Mixed municipal waste (paper, plastic, glass, beverage cartons) accounts for 3,143 kt in the year 2010 (299 kg / capita);

Municipal waste composition: 25

<table>
<thead>
<tr>
<th>Category</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other</td>
<td>35 %</td>
</tr>
<tr>
<td>Paper</td>
<td>13 %</td>
</tr>
<tr>
<td>Textile</td>
<td>7 %</td>
</tr>
<tr>
<td>Carton</td>
<td>2 %</td>
</tr>
<tr>
<td>Bio-waste</td>
<td>25 %</td>
</tr>
<tr>
<td>Plastic</td>
<td>12 %</td>
</tr>
<tr>
<td>Glass</td>
<td>4 %</td>
</tr>
<tr>
<td>Metal</td>
<td>2 %</td>
</tr>
</tbody>
</table>

3. Legal framework, standards and norms

Waste management plans (WMP) / waste prevention programmes (WPP) already adopted: 26

Title: The National WMP of the Czech Republic (2003-2013) has been published in the form of a Government Regulation in compliance with the Waste Act (Regulation No 197/2003).  
Adopted in (year): In 2009 Regulation No 473/2009 was published, revising the WMP. New National WMP 2013-2023 is currently in the process of preparation.  

The national and also regional WMPs include the strategy on the reduction of biodegradable waste going to landfills. 14 regional WMPs are available for the period 2004-2014.

Recovery/recycling rates achieved so far per waste stream (at least paper, metal, plastic and glass): 27 The MSW recycling rate steadily increased over the past decade from 11% to 16%; 28 Packaging waste: paper (93%), glass (71%), metals (52%), plastics (52%); However according to [CZ EKOKOM 2012] the recycling rate of household paper packaging is much lower, even below rate of plastic based on insufficient selective collection of paper from municipal waste and the practice of household heating of paper waste.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Recycling rates of municipal waste</td>
<td>- 14,2% [Eurostat, 2010]; 24,3% [CZ MoE, 2012]</td>
<td>12,0% [CZ MoE, 2012]</td>
</tr>
<tr>
<td>Composting rates of municipal waste</td>
<td>- 2,4% [Eurostat, 2010]; 12,0% [CZ MoE, 2012]</td>
<td>(24 % of biodegradable municipal waste – 12% of total municipal waste generated)</td>
</tr>
</tbody>
</table>

Recovery rates of municipal waste including incineration with energy recovery - 15,5% [Eurostat, 2010]; 8,9% [CZ MoE, 2012].

---

24 Eurostat Commission - [STAT/13/33](http://ec.europa.eu/public_opinion/flash/fl-376_en.htm), 4 March 2013


27 Note: Recycling/recovery targets to be achieved by 2020: 50% (by weight) preparing for re-use and recycling of waste materials such as at least paper, metal, plastic and glass from households and other origins similar to households (Waste Framework Directive 2008/98/EC).

28 Municipal waste in the Czech Republic, EEA report, February 2013
Incineration rates of municipal waste (incineration without energy recovery) – 0,04% [CZ MoE, 2012]. Disposal rates of municipal waste - 67,9% [Eurostat, 2010]; 59,5% [CZ MoE, 2012].

Despite an encouraging increase in recycling/composting rates, it is unlikely to meet the recycling target of 50 % by 2020 without substantial investment.

<table>
<thead>
<tr>
<th>Waste streams</th>
<th>Recovery rate, 2001 (%)</th>
<th>Recycling rate, 2011 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total packaging waste:</td>
<td>75.2</td>
<td>69.7</td>
</tr>
<tr>
<td>Paper and board packaging:</td>
<td>95.3</td>
<td>90.5</td>
</tr>
<tr>
<td>Metal packaging:</td>
<td>68</td>
<td>68</td>
</tr>
<tr>
<td>Plastic packaging:</td>
<td>70.7</td>
<td>57</td>
</tr>
<tr>
<td>Glass packaging:</td>
<td>74.4</td>
<td>74.4</td>
</tr>
</tbody>
</table>

Source: Eurostat, 2011

Reduction targets for biodegradable municipal waste (BMW) achieved (2006, 2009, later): 29 The reduction targets on biodegradable waste going to landfills are not met. The landfill diversion target for 2010 is 1,147,500 t. The final amount of corresponding biodegradable waste landfilled in 2010 is 999,047 t [CZ MoE 2012]. Fulfilment of target of the Landfill Directive on biodegradable waste going to landfills: 98.2%.

National strategy for the reduction of biodegradable waste going to landfills (due 16 July 2003): Adopted in: 2003, the strategy (2003-2013) is included in the national and regional WMPs.


National bodies responsible for MSW management:
- Competent authorities at the level of the 13 regions and the city of Prague. Each region draws up a regional WMP, which has to be compliant with the national WMP.
- Environmental Inspectorates (CEI, ’Česká inspekce životního prostředí’) with its 10 local inspection offices - for monitoring, control and inspections.
- 6,251 municipalities and communal environmental offices/inspectorates – for practical implementation.
- 10 local inspection offices for inspection and controls.
- Council of Waste Management as one of the advisory board to the Minister, including the Czech Republic Waste Management Board.

Note: Article 5(2) of the Landfill Directive 99/31/EC requires the reduction of biodegradable municipal waste going to landfills to:
- 75% by 16 July 2006
- 50% by 16 July 2009
- 35% by 16 July 2016

calculated on the basis of the total amount of biodegradable municipal produced in 1995 or the latest year before 1995 for which standardised Eurostat data is available. Member States that landfilled more than 80 % of their municipal waste in 1995 may postpone each of the targets by a maximum of four years.
6. Denmark (DK)

**General information**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Population (in millions):</strong></td>
<td>5.6</td>
</tr>
<tr>
<td><strong>Total amount of MW (kt)/ year:</strong></td>
<td>4,001</td>
</tr>
<tr>
<td><strong>Total amount of MW (kg)/ person:</strong></td>
<td>719</td>
</tr>
<tr>
<td><strong>Average income (GDP)/ capita in EUR:</strong></td>
<td>43,800</td>
</tr>
</tbody>
</table>

**List of 15 largest cities :**
(Indicate city & population, rank in order of size)

1. Copenhagen (1,167,569)
2. Aarhus (242,914)
3. Odense (166,305)
4. Aalborg (102,312)
5. Frederiksberg (96,718)
6. Esbjerg (71,459)
7. Gentofte (71,052)
8. Gladsaxe (64,102)
9. Randers (60,227)
10. Kolding (57,087)
11. Horsens (52,998)
12. Lyngby-Taarbæk (51,887)
13. Vejle (50,832)
14. Hvidovre (49,724)
15. Roskilde (46,701)

1. Waste management practice

**Collection schemes in place for MSW:**

*Separate collection of recyclables (paper, metal, plastic, glass)*: Separate collection schemes are established for paper, glass packaging and garden waste. The municipalities had to implement collection schemes for metal packaging and certain types of plastic packaging (2003). The introduction of a deposit system for one way beverages packaging in 2002 increased the amount of plastic and metal packaging waste and the amount of recycling.

*Separate collection of organic waste*: Denmark defines municipal waste as all waste from households as this waste is always collected by a municipal collection scheme and in addition fractions similar to household waste from the primary source ‘Institutions, Commerce and Offices’ as these fractions are also collected by a municipal scheme in Denmark.

**Waste treatment** (dominating practices per country: recycling, landfilling, incineration) in % and tons/year:

Municipal waste treatment in 2011:
- Municipal waste landfilled: 3%
- Municipal waste incinerated: 54%
- Municipal waste recycled: 31%
- Municipal waste composted: 12%
2. Waste composition

Composition of municipal solid waste (MSW):

Table 2.1 Main waste fractions of household waste collected for recycling (1000 tonnes) in Denmark

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Paper, paper packaging</td>
<td>181</td>
<td>204</td>
<td>221</td>
<td>211</td>
<td>246</td>
<td>207</td>
<td>221</td>
</tr>
<tr>
<td>Glass</td>
<td>83</td>
<td>111</td>
<td>88</td>
<td>85</td>
<td>91</td>
<td>65</td>
<td>98</td>
</tr>
<tr>
<td>Plastic</td>
<td>2</td>
<td>5</td>
<td>4</td>
<td>4</td>
<td>5</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Metal</td>
<td>17</td>
<td>25</td>
<td>25</td>
<td>31</td>
<td>76</td>
<td>410</td>
<td>313</td>
</tr>
<tr>
<td>Green kitchen waste</td>
<td>45</td>
<td>37</td>
<td>53</td>
<td>41</td>
<td>43</td>
<td>38</td>
<td>50</td>
</tr>
<tr>
<td>Garden waste</td>
<td>505</td>
<td>512</td>
<td>495</td>
<td>592</td>
<td>640</td>
<td>527</td>
<td>611</td>
</tr>
</tbody>
</table>

Date source: SAG-database 2009 and Miliøestyrelsen 2011

3. Legal framework, standards and norms

Waste management plans (WMP) / waste prevention programmes (WPP) already adopted:

Title: Waste Strategy (Regeringens Affaldsstrategi) 2009-2012
Adopted in (year): 2009

Waste Management Plan for the City of Copenhagen 2009-2012
Adopted in (year): 2009
Website: http://www.kk.dk/Borger/Miljoe/Affald/Reglertaksterogplaner/~/media/30EC1D727E4A909908CCA9EBBF3D97.ashx

Title: “Denmark without waste – Recycling more-incinerate less”, a resource strategy for waste management
Adopted in (year): 2013
Website: http://eng.mst.dk/media/mst/Attachments/Ressourcestrategi_UK_web.pdf

Title: Waste Management Plan 2013-2018
Adopted in (year): 2012

---

30 Municipal waste management in Denmark, ETC/SCP, February 2013
Recovery/recycling rates achieved so far per waste stream (at least paper, metal, plastic and glass): 32

<table>
<thead>
<tr>
<th>Waste streams</th>
<th>Recovery rate, 2001 (%)</th>
<th>Recycling rate, 2011 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total packaging waste:</td>
<td>90.5</td>
<td>54.3</td>
</tr>
<tr>
<td>Paper and board packaging:</td>
<td>99.6</td>
<td>63.8</td>
</tr>
<tr>
<td>Metal packaging:</td>
<td>80.7</td>
<td>58</td>
</tr>
<tr>
<td>Plastic packaging:</td>
<td>97.7</td>
<td>22.3</td>
</tr>
<tr>
<td>Glass packaging:</td>
<td>85.9</td>
<td>85.9</td>
</tr>
</tbody>
</table>

Source: Eurostat, 2011

Reduction targets for biodegradable municipal waste (BMW) achieved (2006, 2009, later): 33, 34

The amount BMW landfilled is far below the targets for 2006, 2009 and 2016. The amount landfilled in 2006 was 2% of the BMW generated in 1995. In 1997, Denmark implemented a landfill ban on biodegradable MSW. In 2009 it was reported that the amount of biodegradable MSW in Denmark has been for many years 1-2% of the amount landfilled in 1995.

National strategy for the reduction of biodegradable waste going to landfills (due 16 July 2003): The landfill tax and incineration tax introduced in 1987 and the total ban on the landfilling of combustible waste (decided in 1994 and coming into effect on 1 January 1997) have been the main drivers for treatment of municipal waste in Denmark. In addition, the establishment of separate collection schemes for paper, glass packaging and garden waste has contributed significantly to the increased level of recycling.

National bodies responsible for MSW management:
- Ministry of the Environment
- Danish Environmental Protection Agency

Note: Recycling/recovery targets to be achieved by 2020: 50% (by weight) preparing for re-use and recycling of waste materials such as at least paper, metal, plastic and glass from households and other origins similar to households (Waste Framework Directive 2008/98/EC).

Note: Article 5(2) of the Landfill Directive 99/31/EC requires the reduction of biodegradable municipal waste going to landfills to:
- 75% by 16 July 2006
- 50% by 16 July 2009 and
- 35% by 16 July 2016

calculated on the basis of the total amount of biodegradable municipal produced in 1995 or the latest year before 1995 for which standardised Eurostat data is available. Member States that landfilled more than 80% of their municipal waste in 1995 may postpone each of the targets by a maximum of four years.

Municipal waste management in Denmark, ETC/SCP, February 2013
### 7. Estonia (EE)

#### General information

<table>
<thead>
<tr>
<th>Information</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population (in millions)</td>
<td>1.3</td>
</tr>
<tr>
<td>Total amount of MW (kt)/year</td>
<td>399</td>
</tr>
<tr>
<td>Total amount of MW (kg)/person</td>
<td>298</td>
</tr>
<tr>
<td>Average income (GDP)/capita in EUR</td>
<td>13,000</td>
</tr>
</tbody>
</table>

#### List of 15 largest cities:

1. Tallinn (394,024)
2. Tartu (101,092)
3. Narva (66,980)
4. Kohtla-Järve (46,060)
5. Pärnu (44,192)
6. Viljandi (20,309)
7. Rakvere (16,736)
8. Sillamäe (16,672)
9. Maardu (16,630)
10. Kuressaare (14,921)

#### 1. Waste management practice

**Collection schemes in place for MSW:**

**Separate collection of recyclables** *(paper, metal, plastic, glass):* Pay-as-you throw (PAYT) scheme.

Around 30% of households use ‘pay per sack schemes’.
Around 10% of households have schemes which charge for the volume of the bin.
Around 40% of households have schemes based upon the frequency of collection.
Around 10% of households have weight-based schemes.

An obligatory deposit on both refillable and non-refillable beverage packaging came into force in 2005. The system has been particularly effective in recovering beverage packaging waste.  

The maximum frequency of collection is once every 2 weeks. The municipality also provides a weekly collection of plastic and cans in 60 l sacks, a fortnightly collection of paper and card in a 140 l bin. There is a dense network of ‘bring sites’ for the collection of glass containers.

**Separate collection of organic waste:** Estonia does not have a long history of collecting biodegradable waste fractions separately, apart from waste paper collection. The municipality provides a food waste collection twice a week in small buckets.

**Waste treatment** *(dominating practices per country: recycling, landfilling, incineration) in % and tons/year:* The majority of MSW in Estonia is still landfilled although there has been a large reduction in the last ten years. In 2010, the landfilled amount was 267 000 tonnes compared with 373 000 tonnes in 2006, and 403 000 tonnes in 2001. This decrease indicates a reduction of MSW landfilled from 79 % in 2001 to 64 % in 2010.

---

35 Municipal waste management in Estonia, ETC/SCP, February 2013
36 Diverting waste from landfill, EEA Report No 7/2009
37 Municipal waste management in Estonia, ETC/SCP, February 2013
Incineration is until now not applied.

Overall, recycling has increased from 5 % to 20 % in the last ten years.

Municipal waste management in 2001:
- Municipal waste landfilled: 70 %
- Municipal waste incinerated: 0 %
- Municipal waste recycled: 20 %
- Municipal waste composted: 10 %

2. Waste composition

Composition of municipal solid waste (MSW):

Mixed municipal waste (landfilled) composition in Estonia (2008): 38
- Kitchen waste: 30%
- Plastics: 19%
- Paper and cardboard: 18%
- Glass: 8%
- Metal: 3%
- Other combustible material: 6%
- Other non-combustible material: 4%
- Textile: 4%
- Garden waste: 4%
- Other bio-waste: 1%

3. Legal framework, standards and norms

Waste management plans (WMP) / waste prevention programmes (WPP) already adopted: 39

Title: National Waste Management Plan (RIIGI JÄÄTMEKAVA), 2008-2013 40
Adopted in (year): 2008
Website: http://www.envir.ee/orb.aw/class=file/action=preview/id=1075105/RIIGI+J%C4%C4TMEKAVA+2008-2013.pdf

In addition to the National Waste Plan, a local waste management plan shall set out:
- Development of waste transport organised by a local government within the administrative territory thereof;
- Development of separate collection and sorting of waste, and the corresponding deadlines for specific types of waste;
- Financing of waste management (ETC/SCP, 2009).

Recovery/recycling rates achieved so far per waste stream (at least paper, metal, plastic and glass): ⁴¹

Table 3.1.: Recycling targets for packaging waste and achieved recycling rate in the year 2006

<table>
<thead>
<tr>
<th>Packaging waste fraction</th>
<th>Recycling target in %</th>
<th>Achieved recycling rate in 2006 in %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total packaging waste</td>
<td>25</td>
<td>45.7</td>
</tr>
<tr>
<td>Glass</td>
<td>15</td>
<td>48.5</td>
</tr>
<tr>
<td>Plastics</td>
<td>15</td>
<td>33.7</td>
</tr>
<tr>
<td>Paper</td>
<td>15</td>
<td>55.2</td>
</tr>
<tr>
<td>Metals</td>
<td>15</td>
<td>52.5</td>
</tr>
<tr>
<td>Wood</td>
<td>15</td>
<td>75.4</td>
</tr>
</tbody>
</table>

Source: BIO IS, 2012

Table 3.2.: Recovery and recycling rate achieved in the year 2011

<table>
<thead>
<tr>
<th>Waste streams</th>
<th>Recovery rate, 2001 (%)</th>
<th>Recycling rate, 2011 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total packaging waste</td>
<td>67</td>
<td>62.9</td>
</tr>
<tr>
<td>Paper and board packaging</td>
<td>81.8</td>
<td>79.1</td>
</tr>
<tr>
<td>Metal packaging</td>
<td>62.9</td>
<td>62.9</td>
</tr>
<tr>
<td>Plastic packaging</td>
<td>47.5</td>
<td>39.6</td>
</tr>
<tr>
<td>Glass packaging</td>
<td>65.4</td>
<td>65.4</td>
</tr>
</tbody>
</table>

Source: Eurostat, 2011

Reduction targets for biodegradable municipal waste achieved (2006, 2009, later): ⁴² For Biodegradable Municipal Waste, the National Waste Plan (NWP) gives a general priority to separate bio-waste from mixed MSW; the NWP suggest separate collection of garden waste in cities and enhancing home composting in rural areas.

According to the NWP a strategy for reducing BMW has been defined. Landfilled municipal waste must not exceed the following limits for biodegradable content: ⁴³
- More than 45% by weight from 2010
- More than 30% by weight from 2013
- More than 20% by weight from 2020

Note: Recycling/recovery targets to be achieved by 2020: 50% (by weight) preparing for re-use and recycling of waste materials such as at least paper, metal, plastic and glass from households and other origins similar to households (Waste Framework Directive 2008/98/EC).

Note: Article 5(2) of the Landfill Directive 99/31/EC requires the reduction of biodegradable municipal waste going to landfills to:
- 75% by 16 July 2006
- 50% by 16 July 2009 and
- 35% by 16 July 2016

calculated on the basis of the total amount of biodegradable municipal produced in 1995 or the latest year before 1995 for which standardised Eurostat data is available. Member States that landfilled more than 80% of their municipal waste in 1995 may postpone each of the targets by a maximum of four years.

Eionet, 2012
Estonia had already fulfilled the Landfill Directive’s requirement to reduce landfill of BMW to 75% (related to the generated amount in 1995) by 2006, way before the 2010 deadline. The 50% requirement to be fulfilled in 2013 was already achieved in 2009. When a new incinerator close to Tallinn with a yearly capacity of 220,000 tonnes will be fully operational, it is definitely feasible that Estonia will be able to fulfil both the 35% EU requirement in 2020 (related to BMW generation in 1995) and Estonia’s own target of 20% in 2020 (related to MSW generated in 2020).

**National strategy for the reduction of biodegradable waste going to landfills (due 16 July 2003):**

**Title:** National Waste Management Plan

**Adopted in (year):** 2008

The Estonian strategy to divert Biodegradable Municipal Waste away from landfills uses two approaches: 44

- Biodegradable municipal waste shall be collected separately from mixed MSW in order to allow for recovery operations producing high quality products. The obligation for separate collection refers to bio-waste and packaging paper waste.
- A ban of untreated waste going to landfills.

The National Waste Management Plan suggests separate collection of garden waste in cities and enhancing home composting in rural areas.

**National bodies responsible for MSW management:**

- Ministry of Environment – Waste management coordination and legislation development on the national level;
- Central Estonian Waste Management Centre - Waste management organisation (members 24 local municipalities from the central part of Estonia);
- Waste Management Centre of West-Virumaa - Waste management organisation (members 15 local municipalities from the Virumaa county);
- Estonian Environment Agency (EEIC) – collect and provide information on waste management.
- Municipalities (bigger municipalities: Tallinn City, Tartu City, Pärnu City, Narva City) – responsible to build on waste management plans but they can do so in coordination with other municipalities to form a regional waste management plan. Upon preparation of a waste management plan, the provisions of the national waste management plan shall be taken into account (EEA, 2009 and ETC/SCP, 2009).
- Private companies – found by tenders, responsible for waste collection.

---

44 Eionet, 2012
8. Finland (FI)

### General information

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population (in millions)</td>
<td>5.4</td>
</tr>
<tr>
<td>Total amount of MW (kt)/ year</td>
<td>2,719</td>
</tr>
<tr>
<td>Total amount of MW (kg)/ person</td>
<td>505</td>
</tr>
<tr>
<td>Average income (GDP)/ capita in EUR</td>
<td>35,600</td>
</tr>
</tbody>
</table>

**List of 15 largest cities:**

1. Helsinki (558,457)
2. Espoo (256,760)
3. Tampere (202,687)
4. Vantaa (190,058)
5. Turku (175,945)
6. Oulu (128,618)
7. Lahti (98,826)
8. Kuopio (89,104)
9. Jyväskylä (85,026)
10. Pori (76,772)

---

1. **Waste management practice**

**Collection schemes in place for MSW:**

**Separate collection of recyclables** (*paper, metal, plastic, glass*): The municipalities are responsible for collection and treatment of the MW from households. Finland has many municipalities including many small ones, and therefore it is an advantage that many municipalities have organised the management of waste through 39 *inter-municipal associations*. This has improved the municipal waste infrastructure during the last 15-20 years. Very good results achieved for *paper* and *tyres*, where waste streams have clear targets and division of responsibilities.

**Separate collection of organic waste**: The Finish municipal waste strategy is based on the source separation of waste. Therefore, most of the organic waste is composted or anaerobically digested and MBT is not applied as such.

**Waste treatment** *(dominating practices per country: recycling, landfilling, incineration)* in % and tons/year:

The majority of MSW is still landfilled. In 2010, the figure was 1.1 million tonnes compared to 1.5 million tonnes in 2006 and in 2001. This decrease implies a reduction of MSW landfilled from 61 % in 2001 to 45 % in 2010 (as share of the generated amount). The total incinerated MSW has increased from 9 % to 22 % from 2001 to 2010. Over 550,000 tonnes of MSW was incinerated in 2010.

**Municipal waste treatment in 2011:**
- Municipal waste landfilled: 40%
- Municipal waste incinerated: 25%
- Municipal waste recycled: 22%
- Municipal waste composted: 13%

---

45 ETC/RWM, 2008
46 ETC/SCP report, February 2013, Municipal Waste Management in Finland
2. Waste composition

Table 2.1. Composition of recycled municipal waste in Finland from 2003 to 2010 (in 1000 tonnes)

<table>
<thead>
<tr>
<th></th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paper and cardboard</td>
<td>353</td>
<td>360</td>
<td>347</td>
<td>417</td>
<td>390</td>
<td>383</td>
<td>399</td>
<td>311</td>
</tr>
<tr>
<td>Biowaste</td>
<td>128</td>
<td>140</td>
<td>168</td>
<td>162</td>
<td>262</td>
<td>277</td>
<td>268</td>
<td>295</td>
</tr>
<tr>
<td>Glass</td>
<td>124</td>
<td>119</td>
<td>122</td>
<td>134</td>
<td>135</td>
<td>82</td>
<td>66</td>
<td>76</td>
</tr>
<tr>
<td>Metal</td>
<td>23</td>
<td>25</td>
<td>24</td>
<td>32</td>
<td>28</td>
<td>47</td>
<td>10</td>
<td>14</td>
</tr>
<tr>
<td>Wood</td>
<td>1</td>
<td>4</td>
<td>9</td>
<td>1</td>
<td>9</td>
<td>1</td>
<td>8</td>
<td>6</td>
</tr>
<tr>
<td>Plastic</td>
<td>6</td>
<td>1</td>
<td>1</td>
<td>5</td>
<td>10</td>
<td>2</td>
<td>8</td>
<td>12</td>
</tr>
<tr>
<td>WEEE</td>
<td>11</td>
<td>11</td>
<td>15</td>
<td>39</td>
<td>50</td>
<td>45</td>
<td>42</td>
<td>45</td>
</tr>
<tr>
<td>Others</td>
<td>43</td>
<td>55</td>
<td>53</td>
<td>48</td>
<td>69</td>
<td>86</td>
<td>119</td>
<td>63</td>
</tr>
<tr>
<td>Total</td>
<td>689</td>
<td>715</td>
<td>739</td>
<td>839</td>
<td>953</td>
<td>884</td>
<td>920</td>
<td>822</td>
</tr>
</tbody>
</table>

Source: Statistics Finland, 2012

3. Legal framework, standards and norms

Waste management plans (WMP) / waste prevention programmes (WPP) already adopted: 47

Adopted in (year): 2008

The National Waste Plan sets targets for 2016. One of the main targets is to maintain the volume of municipal solid waste at the 2000 level and then achieve a decrease by 2016. Another target is to recycle 50 % of municipal waste, generating energy from another 30 % and ensuring that no more than 20 % is disposed of in landfills. 48

The 50 % recycling target of MSW is detailed into a target for material recycling of 30 %, composting at source 6 % and composting or anaerobic digestion (in biogas plants) 14 %.

Recovery/recycling rates achieved so far per waste stream (at least paper, metal, plastic and glass): 49 In the last two years the recycling rate of BMW has increased with five percentage points and it has reached a level of 13 %. The target is to reach 20 % by 2016.

---

48 Finland, 2009 and EEA, 2010
49 Note: Recycling/recovery targets to be achieved by 2020: 50% (by weight) preparing for re-use and recycling of waste materials such as at least paper, metal, plastic and glass from households and other origins similar to households (Waste Framework Directive 2008/98/EC).
<table>
<thead>
<tr>
<th>Waste streams</th>
<th>Recovery rate, 2001 (%)</th>
<th>Recycling rate, 2011 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total packaging waste</td>
<td>89.6</td>
<td>58.7</td>
</tr>
<tr>
<td>Paper and board packaging</td>
<td>106</td>
<td>96.8</td>
</tr>
<tr>
<td>Metal packaging</td>
<td>79.9</td>
<td>79.9</td>
</tr>
<tr>
<td>Plastic packaging</td>
<td>46.8</td>
<td>25.4</td>
</tr>
<tr>
<td>Glass packaging</td>
<td>87.9</td>
<td>87.9</td>
</tr>
</tbody>
</table>

Source: Eurostat, 2011

Reduction targets for biodegradable municipal waste achieved (2006, 2009, later) 50: In 2005, a landfill ban on non-pre-treated BMW was introduced. A new landfill ban on placing organic waste at landfills will come into force in 2016. The ban concerns wastes that contain more than 10 % of organic substances.51

National bodies responsible for MSW management:
- Government: approves national waste management plans
- Ministry of the Environment
- Municipalities: responsible for collection and treatment of the generated municipal waste from households. Finland has many municipalities including many small ones, and therefore it is an advantage that many municipalities have organised the management of waste through 39 inter-municipal associations
- Regional State Administrative Agencies

Note: Article 5(2) of the Landfill Directive 99/31/EC requires the reduction of biodegradable municipal waste going to landfills to:
- 75% by 16 July 2006
- 50% by 16 July 2009 and
- 35% by 16 July 2016

calculated on the basis of the total amount of biodegradable municipal produced in 1995 or the latest year before 1995 for which standardised Eurostat data is available. Member States that landfilled more than 80 % of their municipal waste in 1995 may postpone each of the targets by a maximum of four years.

51 Municipal Waste Management in Finland, ETC/SCP, February 2013
9. France (FR)

General information

<table>
<thead>
<tr>
<th>Population (in millions):</th>
<th>65.6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total amount of MW (kt)/ year:</td>
<td>34,336</td>
</tr>
<tr>
<td>Total amount of MW (kg)/ person:</td>
<td>527</td>
</tr>
<tr>
<td>Average income (GDP)/ capita in EUR:</td>
<td>31,000</td>
</tr>
<tr>
<td>List of 15 largest cities:</td>
<td></td>
</tr>
<tr>
<td>(Indicate city &amp; population, rank in order of size)</td>
<td></td>
</tr>
<tr>
<td>1. Paris (Île-de-France) (2,138,551)</td>
<td></td>
</tr>
<tr>
<td>2. Marseille (Provence-Alpes-Côte d'Azur) (794,811)</td>
<td></td>
</tr>
<tr>
<td>3. Lyon (Rhône-Alpes) (472,317)</td>
<td></td>
</tr>
<tr>
<td>4. Toulouse (Midi-Pyrénées) (433,055)</td>
<td></td>
</tr>
<tr>
<td>5. Nice (Provence-Alpes-Côte d'Azur) (338,620)</td>
<td></td>
</tr>
<tr>
<td>6. Nantes (Pays de la Loire) (277,269)</td>
<td></td>
</tr>
<tr>
<td>7. Strasbourg (Alsace) (274,845)</td>
<td></td>
</tr>
<tr>
<td>8. Montpellier (Languedoc-Roussillon) (248,252)</td>
<td></td>
</tr>
<tr>
<td>9. Bordeaux (Aquitaine) (231,844)</td>
<td></td>
</tr>
<tr>
<td>10. Lille (Nord-Pas-de-Calais) (228,328)</td>
<td></td>
</tr>
</tbody>
</table>

1. Waste management practice

Collection schemes in place for MSW: 52

Separate collection of recyclables (paper, metal, plastic, glass): Packaging waste (paper, metal, plastic, glass) are separately collected under the Eco-emballages system.

Separate collection of organic waste: A separate collection of organic waste is organised in 11 departments and is foreseen in 54 departments.

Waste treatment: (dominating practices per country: recycling, landfilling, incineration) in % and tons/year:

Municipal waste treatment in 2011:
- Municipal waste landfilled: 28%
- Municipal waste incinerated: 35%
- Municipal waste recycled: 19%
- Municipal waste composted: 18%

2. Waste composition

Composition of municipal solid waste (MSW): Street sweeping, sewage sludge and garden and park waste (from municipal sources), household waste (recycling centre and bulky items, household hazardous waste and, mixed and separately collected household waste), trade waste similar in nature to household waste. 53

---

http://www2.ademe.fr/servlet/getDoc?id=83366&p1=00&ref=17597
53 Municipal waste management in France, EEA report, February 2013
3. Legal framework, standards and norms

Waste management plans (WMP) / waste prevention programmes (WPP) already adopted: 54

Title: Waste Prevention Programme (Prévention de la production de déchets)
Adopted in (year): 2004
Website: http://www2.ademe.fr/servlet/KBaseShow?sort=-1&cid=96&m=3&catid=23839

Recovery/recycling rates achieved so far per waste stream (at least paper, metal, plastic and glass): 55, 56

- Total MSW recycling, related to MSW generation: 26% (2001), 35% (2010)
- Waste collected: 6.8 million tonnes in 2001 and 11.8 million tonnes in 2009
- Share of material recycling: 53% of the total MSW recycled
- Share of organic recycling: 47% of the total MSW recycled
- MSW generation increased by 7% while the amount of municipal organic waste recycled increased by 48% (2001-2010)
- The amount of MSW recycled as materials increased by 39% (2001-2010)
- In 2010, 34.5 million tonnes of MSW were reportedly generated, 6 million tonnes were recycled as materials and 5.9 million tonnes were recycled as organic material
- Sufficient and significant efforts still need to be made in order to meet the target imposed by the Waste Framework Directive (50% by 2020).

In 2009, the first Grenelle Law has been implemented. The key points of this law include: 57

- Reduction of the production of household waste and similar waste by 7% per capita between 2009 and 2014;
- Reduction of waste sent to landfill or incineration of 15% between 2009 and 2012;
- Implementation of economic instruments (variable payment scheme for collection, such as pay as you throw) between 2009 and 2014;
- Implementation of waste prevention plans at municipality level; and
- Recycling rate (material and organic recycling) of 35% in 2012 (24% in 2004).

<table>
<thead>
<tr>
<th>Waste streams</th>
<th>Recovery rate, 2001 (%)</th>
<th>Recycling rate, 2011 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total packaging waste</td>
<td>71.2</td>
<td>61.3</td>
</tr>
<tr>
<td>Paper and board packaging</td>
<td>93.9</td>
<td>88</td>
</tr>
<tr>
<td>Metal packaging</td>
<td>74.4</td>
<td>73.6</td>
</tr>
<tr>
<td>Plastic packaging</td>
<td>61</td>
<td>23.3</td>
</tr>
<tr>
<td>Glass packaging</td>
<td>70.7</td>
<td>70.7</td>
</tr>
</tbody>
</table>

Source: Eurostat, 2011

55 Note: Recycling/recycling targets to be achieved by 2020: 50% (by weight) preparing for re-use and recycling of waste materials such as at least paper, metal, plastic and glass from households and other origins similar to households (Waste Framework Directive 2008/98/EC).
56 Municipal waste management in France, ETC/SCP, February 2013
57 First Grenelle Law (2009-967, 3 August 2009, Art. 46, relating to the implementation of the Grenelle for the environment)
Regional differences of MSW recycling (2001-2008):

**Paris region (‘Ile de France’):**
- the highest amount of MSW generated in France;
- recycling rate 23% of the total MSW generated (2008) – equivalent to more than 2 million tonnes of material and organic recovery;
- the organic recycling rate has remained constantly low (7% over the reported period). This indicates that a significant proportion of BMW is either incinerated or landfilled in the French capital region.

**Martinique region:** recycling rate 6% of the MSW generated in 2008.

**Provence-Alpes-Côte d’Azur region:** 10% of the generated MSW in 2008. In 2008, the total MSW generated in that region was 3.7 million tonnes (third largest MSW producer in France).

**Alsace region:** 40% of the MSW generated in 2008, has the highest recycling rate (material recycling excluding organic recycling was 29% in 2008).

**Poitou-Charentes region:** has the largest organic recycling rate, with a very large increase from 11% in 2002 to 29% in 2008. This region has a low population density of 68 inh./km² and is considered semi-rural with a relatively low rate of urbanisation. On the other hand, Corsica has the lowest organic recycling rate at 1%.

Reduction targets for biodegradable municipal waste achieved (2006, 2009, later): The generated amount of BMW was 18 615 000 tonnes in 1995. France has already met its legal obligations for the first two targets back in 2006. France has not yet met its 2016 target. In order to meet its last target, France shall landfill no more than 6.5 million tonnes of BMW by 2016 (an estimated 7 million tonnes of BMW were disposed to landfill in 2010).

National bodies responsible for MSW management:
- Ministry of Ecology, Sustainable Development and Energy
- ADEME (French Environment and Energy Management Agency): supervise, coordinate, facilitate and undertake operations related to waste management

---

Note: Article 5(2) of the Landfill Directive 99/31/EC requires the reduction of biodegradable municipal waste going to landfills to:
- 75% by 16 July 2006
- 50% by 16 July 2009 and
- 35% by 16 July 2016

Calculated on the basis of the total amount of biodegradable municipal produced in 1995 or the latest year before 1995 for which standardised Eurostat data is available. Member States that landfilled more than 80% of their municipal waste in 1995 may postpone each of the targets by a maximum of four years.
10. Germany (DE)

General information

<table>
<thead>
<tr>
<th>Population (in millions):</th>
<th>82.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total amount of MW (kt)/ year:</td>
<td>48,805</td>
</tr>
<tr>
<td>Total amount of MW (kg)/ person:</td>
<td>597</td>
</tr>
<tr>
<td>Average income (GDP)/ capita in EUR:</td>
<td>32,600</td>
</tr>
</tbody>
</table>

List of 15 largest cities:
(Indicate city & population, rank in order of size)

1. Berlin (3,460,725)
2. Hamburg (1,786,448)
3. München (1,353,186)
4. Köln (1,007,119)
5. Frankfurt am Main (679,664)
6. Stuttgart (606,588)
7. Düsseldorf (588,735)
8. Dortmund (580,444)
9. Essen (574,635)
10. Bremen (547,340)
11. Dresden (523,058)
12. Leipzig (522,883)
13. Hannover (522,686)
14. Nuremberg (505,664)
15. Duisburg (489,599)

1. Waste management practice

Collection schemes in place for MSW: Germany was among the first European countries to introduce policies to limit landfilling in the 1990s. Measures included schemes for collecting packaging waste, bio-waste and waste paper separately.

Separate collection of recyclables (paper, metal, plastic, glass): 59
- Duales Sytems Deutschland GmbH introduced in 1990;
- Separate collection of paper waste and plastic waste: take-back and recycling obligation;
- The latest initiative is the introduction of the so-called recycling bin that aims to increase recycling of plastics and metals from households by 2015. It is estimated that seven kilograms per capita per year of high-grade material of metal and plastic other than packaging can additionally be material recycled (UBA, 2011);
- The collection of paper is mostly realised via municipal collection systems.

Separate collection of organic waste:
- Separate collection of bio-waste, namely organic waste from households and commerce, plant residues from industrial food processing and agriculture;
- Separate collection for recycling organic waste as fertiliser and soil improver;
- Separate collection is established in many municipalities. Bio-waste is collected in 80 l to 1.100 l bins (summer half year: weekly/biweekly, wintertime every 2 or 4 weeks);
- Separate collection of garden waste;
- A bin volume-based system or more rarely a sack volume-based systems are used. Frequency-based systems exist but are rather common in rural areas and not in big cities where the collection routine is more firm. Weight-based systems are the exception (they exist e.g. in Dresden);
- Introduction of mandatory separate collection of bio-waste to start in 2015 (UBA, 2011);

59 Eignet, Factsheet for Germany, 2012
Waste treatment (dominating practices per country: recycling, landfilling, incineration) in % and tons/year:

Pre-treatment of mixed household waste is carried out in mechanical-biological treatment plants. MSW which cannot be recycled has to be either incinerated or mechanical-biological treated. Currently 8.5 Mio. t/year of bio-waste and garden waste are separately collected and recovered. The theoretical potential of bio- and garden waste lies between 13 and 15 Mio. t/year. The practical feasible potential for separate collection of bio- and garden waste is estimated to be 10 to 11 Mio. t/year.  

Municipal waste management rates in 2011:
- Municipal waste landfilled: 1 %
- Municipal waste incinerated: 37 %
- Municipal waste recycled: 45 %
- Municipal waste composted: 17 %

2. Waste composition

Composition of municipal solid waste (MSW):

Table 2.1 Composition of recycled municipal waste in Germany from 2002 to 2010 (stated in 1000 tonnes)

<table>
<thead>
<tr>
<th>1000 tonnes</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glass*</td>
<td>3 106</td>
<td>3 289</td>
<td>3 100</td>
<td>3 572</td>
<td>1 929</td>
<td>2 233</td>
<td>2 480</td>
<td>2 442</td>
<td>2 523</td>
</tr>
<tr>
<td>Paper &amp; cardboard</td>
<td>8 590</td>
<td>8 419</td>
<td>7 740</td>
<td>7 895</td>
<td>8 080</td>
<td>8 121</td>
<td>8 528</td>
<td>8 088</td>
<td>8 000</td>
</tr>
<tr>
<td>Light packaging</td>
<td>5 654</td>
<td>4 929</td>
<td>4 734</td>
<td>4 601</td>
<td>4 532</td>
<td>4 975</td>
<td>4 885</td>
<td>5 000</td>
<td>5 141</td>
</tr>
<tr>
<td>WEEE</td>
<td>105</td>
<td>104</td>
<td>263</td>
<td>291</td>
<td>409</td>
<td>396</td>
<td>469</td>
<td>605</td>
<td>586</td>
</tr>
<tr>
<td>Metal, textile etc.</td>
<td>1 313</td>
<td>1 204</td>
<td>1 333</td>
<td>1 274</td>
<td>1 570</td>
<td>1 685</td>
<td>1 842</td>
<td>1 607</td>
<td>1 730</td>
</tr>
<tr>
<td>Green kitchen waste from households</td>
<td>3 465</td>
<td>3 447</td>
<td>3 661</td>
<td>3 776</td>
<td>3 757</td>
<td>3 743</td>
<td>3 897</td>
<td>3 882</td>
<td>3 764</td>
</tr>
<tr>
<td>Organic food waste from canteens etc.</td>
<td>485</td>
<td>354</td>
<td>578</td>
<td>476</td>
<td>603</td>
<td>668</td>
<td>535</td>
<td>694</td>
<td>726</td>
</tr>
<tr>
<td>Garden and park waste</td>
<td>4 163</td>
<td>3 845</td>
<td>4 172</td>
<td>3 924</td>
<td>4 044</td>
<td>4 509</td>
<td>4 421</td>
<td>4 607</td>
<td>4 964</td>
</tr>
</tbody>
</table>

Source: Statistics Germany, 2012. * The decrease of recycled glass is due to a change of the registration principles.

3. Legal framework, standards and norms

Waste management plans (WMP) / waste prevention programmes (WPP) already adopted:  

The German federal states (“Länder”) develop regional waste management plans. There is no national waste management plan.

A national waste prevention programme is being developed.

---

60 The future of biowaste recovery from a German perspective, Dach, Joachim - SITA Deutschland GmbH
Recovery/recycling rates achieved so far per waste stream (at least paper, metal, plastic and glass): 62 MSW which cannot be recycled has to be either incinerated or mechanical-biological treated.

<table>
<thead>
<tr>
<th>Waste streams</th>
<th>Recovery rate, 2001 (%)</th>
<th>Recycling rate, 2011 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total packaging waste:</td>
<td>97.4</td>
<td>71.8</td>
</tr>
<tr>
<td>Paper and board packaging:</td>
<td>99.8</td>
<td>88</td>
</tr>
<tr>
<td>Metal packaging:</td>
<td>93.6</td>
<td>92.8</td>
</tr>
<tr>
<td>Plastic packaging:</td>
<td>99.5</td>
<td>48.5</td>
</tr>
<tr>
<td>Glass packaging:</td>
<td>88.4</td>
<td>88.4</td>
</tr>
</tbody>
</table>

Source: Eurostat, 2011

Reduction targets for biodegradable municipal waste achieved (2006, 2009, later): 63 The targets are related to the generated German amount of BMW in 1995 (28.4 million tonnes).

Limit organic waste going to landfill and recycle or recover as much as possible of this waste stream. Reduce gas and liquid emissions from landfill sites.

Germany has reported to the European Commission that zero tonnes of BMW were landfilled in 2006, 2007, 2008 and 2009. This is due to the fact that Germany introduced a ban on non-pretreated MSW (organic content in waste going to landfills limited to less than 3% total organic carbon (TOC), introduced in 1993 with a transition period until 1 June 2005).

Requirements set in 2009 for (i) Municipal waste after 1 June 2005: max 5% carbon content in waste direct landfilled; (ii) Municipal waste, which has been mechanically/biologically pre-treated: max 18% carbon content and very low content of biodegradable organic carbon in waste landfilled measured with degradation tests.

With the implementation of the above mentioned initiatives, Germany had already fulfilled the 75% requirement in 2006, the 50% requirement in 2009 and the 35% requirement in 2013.

National strategy for the reduction of biodegradable waste going to landfills (due 16 July 2003): In general the German national strategy for the reduction of biodegradable waste going to landfills comprises the following elements:

- Separate collection of biodegradable waste from households and commerce

62 **Note:** Recycling/recovery targets to be achieved by 2020: 50% (by weight) preparing for re-use and recycling of waste materials such as at least paper, metal, plastic and glass from households and other origins similar to households (Waste Framework Directive 2008/98/EC).

63 **Note:** Article 5(2) of the Landfill Directive 99/31/EC requires the reduction of biodegradable municipal waste going to landfills to:
- 75% by 16 July 2006
- 50% by 16 July 2009 and
- 35% by 16 July 2016

calculated on the basis of the total amount of biodegradable municipal produced in 1995 or the latest year before 1995 for which standardised Eurostat data is available. Member States that landfilled more than 80% of their municipal waste in 1995 may postpone each of the targets by a maximum of four years.
- Composting or anaerobic digestion of biodegradable waste
- Separate collection of paper and cardboard
- Ban of untreated waste going to landfill, criteria for the landfilling of waste and aim of the treatment is esp. the limitation of the organic content.

- In 1999, the German government committed itself to completely recover all municipal waste by 2020, so that landfilling of municipal waste and waste treatment residues would no longer be necessary. This is an ambitious objective and includes, for example, recovering waste incineration residues and further developing of treatment technologies such as sorting and MBT (EEA, 2009);

- A ban on landfilling un-pretreated MSW by defining requirements to the organic content of MSW direct landfilled (maximum 5 % carbon content) or maximum 18 % if the waste has been pre-treated. The first initiatives in relation to this ban were taken in 1993, followed up in 2001 and 2002 and fully implemented in 2005 (EEA, 2009 and ETC/SCP, 2009);

National bodies responsible for MSW management:
- Responsibility for waste management is shared between the national Government, the Federal States and local authorities.
- Sixteen Federal States (Bundesländer) – each Federal State adopts its own waste management act containing supplementary regulations to the national law, e.g. concerning regional waste management concepts and rules on requirements for disposal.
- Ministry of Environment - sets priorities, participates in the enactment of laws, oversees strategic planning, information and public relations and defines requirements for waste facilities.
11. Greece (GR)

### General information

<table>
<thead>
<tr>
<th>Population (in millions):</th>
<th>11.1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total amount of MW (kt)/ year:</td>
<td>5,607</td>
</tr>
<tr>
<td>Total amount of MW (kg)/ person:</td>
<td>496</td>
</tr>
<tr>
<td>Average income (GDP)/ capita in EUR:</td>
<td>17,200</td>
</tr>
</tbody>
</table>

#### List of 15 largest cities:

(Indicate city & population, rank in order of size)

1. Athens (Attica) 729,137
2. Thessaloniki (Central Macedonia) 354,290
3. Piraeus (Attica) 172,429
4. Patras (West Greece) 163,360
5. Peristeri (Attica) 137,659
6. Heraklion (Crete) 137,154
7. Larissa (Thessaly) 128,758
8. Kallithea (Attica) 107,767
9. Nikaia (Attica) 94,608
10. Kalamaria (Central Macedonia) 91,617

#### Regions:

1. Region of Eastern Macedonia
2. Region of Central Macedonia
3. Region of Western Macedonia
4. Region of Epirus
5. Region of Thessalia
6. Region of Central Greece (Sterea Ellada)
7. Region of Attica
8. Region of Western Greece
9. Region of Peloponnese
10. Region of Ionian Islands
11. Region of Northern Aegean
12. Region of Southern Aegean
13. Region of Crete

### 1. Waste management practice

**Collection schemes are in place for MSW:** Collection coverage for municipal waste: 100%. A complete coverage of urban and rural areas, including small islands is ensured. The main municipal waste collection scheme is operated by Municipalities (public sector).

**Separate collection of recyclables (paper, metal, plastic, glass):** Collection of packaging waste is mainly organised by close to home bring systems (collection points with containers) that provide for co-mingled collection; kerbside collection is uncommon. Each municipality is responsible for running the collection scheme for packaging waste, while the investment (purchase of bags, containers, collection vehicles) and operational costs of that scheme is covered by the Greek “Green Dot” system (Hellenic Recovery Recycling Corporation – HE.R.R.Co S.A.). Paper (non-packaging) is typically recycled in containers in some large municipalities or in the dry bin (blue bin). Commercial waste is only collected separately/co-mingled to limited extent. No incentive systems to favour prevention and participation to separate collection (PAYT schemes) are in place. \(^{64}\)

---

\(^{64}\) PAYT: Pay as you throw schemes
Separate collection of organic waste: By 2015, the rate of separate collection of bio-waste should reach, at least, 5 % of weight of bio-waste and by 2020, at least, 10 % of weight of bio-waste [art. 41 of Law 4042/2012].

Bio-waste is not collected separately. There are local-scale programmes for bio-waste collection at home and composting using special domestic composting bins. An amount of about 10,000 tonnes of bio-wastes are treated in domestic composting bins [GR MEECC 2012].

Waste treatment: (dominating practices per country: recycling, landfilling, incineration) in % and tons/year:

Municipal waste treatment rates in 2011:
- Municipal waste landfilled: 82% (4.2 million tonnes in 2010)
- Municipal waste incinerated: 0%
- Municipal waste recycled: 15%
- Municipal waste composted: 3%

2. Waste composition

Composition of municipal solid waste (MSW):

Figure: Average MSW composition (YPEKA, 2011)
3. Legal framework, standards and norms

Waste management plans (WMP) / waste prevention programmes (WMP) already adopted: 65

Title: “Measures and Terms for Solid Waste Management. National and Regional Plan”
Μέτρα και Όροι για τη Διαχείριση Στερεών Αποβλήτων. Εθνικός και Περιφερειακός Σχεδιασμός (ΚΥΑ Η.Π. 50910/2727/2003)

Adopted in: 2003
Website: www.elinyae.gr/el/lib_file_upload/b1909_2003.pdf


Recovery/recycling rates achieved so far per waste stream (at least paper, metal, plastic and glass) 66

Municipal waste: 67
- Recycling rates of municipal waste (2009): 17%
- Composting rates of municipal waste (2009): 1%
- Recovery rates of municipal waste including incineration with energy recovery (2009): 18,3%

Packaging waste: 68

<table>
<thead>
<tr>
<th>Waste streams</th>
<th>Recycling rate, 2001 (%)</th>
<th>Recycling rate, 2011 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total packaging waste</td>
<td>62.4</td>
<td>62.4</td>
</tr>
<tr>
<td>Paper and board packaging</td>
<td>91.9</td>
<td>91.9</td>
</tr>
<tr>
<td>Metal packaging</td>
<td>44.1</td>
<td>44.1</td>
</tr>
<tr>
<td>Plastic packaging</td>
<td>33</td>
<td>32.4</td>
</tr>
<tr>
<td>Glass packaging</td>
<td>36.9</td>
<td>36.9</td>
</tr>
</tbody>
</table>

Source: Eurostat, 2011

66 Note: Recycling/recovery targets to be achieved by 2020: 50% (by weight) preparing for re-use and recycling of waste materials such as at least paper, metal, plastic and glass from households and other origins similar to households (Waste Framework Directive 2008/98/EC).
68 BiPRO (2012)
Reduction targets for biodegradable municipal waste achieved (2006, 2009, later): 69
Rate of biodegradable waste going to landfills: 87.3% 70
Greece has missed the target for 2010 by some 680 000 tonnes 71
Greece needs to take radical action in order to achieve the 2013 and 2020 targets to reduce biodegradable municipal waste (BMW) landfilled to 50 and 35% of BMW generated in 1995, respectively.

National strategy for the reduction of biodegradable waste going to landfills (due 16 July 2003):
The major driver behind waste management in Greece in the last decade has been the Joint Ministerial Decision 50910/2727/2003 ‘on measures and terms for solid waste management - national and regional planning management’ with the National Waste Management Plan annexed to it.

National bodies responsible for MSW management:
- The Ministry of Environment, Energy and Climate Change (YPECA in Greek) – oversee national and EU waste legislation and permit procedures
- Ministry of Interior
- Ministry of Development
- 13 Administrative regions (licensing, waste master plans, planning, collection)
- Regional Waste Management Bodies (Intermunicipal Associations or S.A. of Municipalities, responsible for regional waste management plans)
- 13 new Waste Management Authorities (one in each region)
- NGOs dealing with waste management (source separation, recycling, composting, bio-waste). Most of them are strongly opposing thermal treatment.

Note: Article 5(2) of the Landfill Directive 99/31/EC requires the reduction of biodegradable municipal waste going to landfills to:
- 75% by 16 July 2006
- 50% by 16 July 2009 and
- 35% by 16 July 2016

calculated on the basis of the total amount of biodegradable municipal produced in 1995 or the latest year before 1995 for which standardised Eurostat data is available. Member States that landfilled more than 80 % of their municipal waste in 1995 may postpone each of the targets by a maximum of four years.

According to Greek MECC, the first official data for biodegradable waste data was for the year 1997 and accounted to 2,600 ktn. According to 2009 data Greece has overdrawn the target by 12.3% [GR MEECC 2012]

EEA (2013)
12. Hungary (HU)

General information

<table>
<thead>
<tr>
<th>Population (in millions):</th>
<th>9.9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total amount of MW (kt)/ year:</td>
<td>3,809</td>
</tr>
<tr>
<td>Total amount of MW (kg)/ person:</td>
<td>382</td>
</tr>
<tr>
<td>Average income (GDP)/ capita in EUR:</td>
<td>9,800</td>
</tr>
</tbody>
</table>

List of 15 largest cities:
(Indicate city & population, rank in order of size)

1. Budapest (1,733,685)
2. Debrecen (208,016)
3. Szeged (170,285)
4. Miskolc (168,275)
5. Pécs (157,721)
6. Győr (131,267)
7. Nyíregyháza (117,852)
8. Kecskemét (113,275)
9. Székesfehérvár (101,943)
10. Szombathely (79,348)
11. Szolnok (74,341)
12. Tatabánya (70,003)
13. Kaposvár (67,686)
14. Érd (65,277)
15. Veszprém (64,024)

1. Waste management practice

Collection schemes in place for MSW: A general campaign was launched in 2001 to gradually extend the network of ‘free of charge’ separate waste collection systems in public places. The purpose of the instrument is to dramatically increase the rate of recycling by making it easier and accessible for the population to recycle waste materials.

Separate collection of recyclables (paper, metal, plastic, glass): The Solid Waste Management Strategy 2007-2016 stipulates that selective waste collection facilities should be ensured for 60% of the inhabitants by 2009 and for 80% by 2013. 72

The implementation of separate collection under the umbrella of extended producer responsibility schemes (i.e. Green Dot for packaging waste) resulted in the increased separate collection of PET plastics, paper, glass and aluminum waste. There are approx. 5,000 public separate collection facilities collecting a total amount of 485,000 tonnes. Approximately 57% of the population had access to these facilities in 2010 and an additional 5-6% had separate collection at their households.

No Pay-as-you-throw (PAYT) scheme has been identified in Hungary.

Next to the further development of separate collection, Hungary would like to introduce door-to-door collection and from 2014 a deposit refund system. By 2015 separate collection shall be set up for at least the following: paper, metal, plastic and glass.

Separate collection of organic waste: It is planned to be further developed.

---

72 Hungarian Waste Management Policy, Tamas Dienes
Waste treatment (dominating practices per country: recycling, landfilling, incineration) in % and tons/year: The dominant treatment of municipal waste in Hungary is landfilling. The country's performance in terms of MSW recycling has been improving dramatically over the last decade from close-to-zero (2 % in 2001) to 21 % in 2010. The majority, 18 percentage point was material recycling (including metal, glass, plastic, paper and cardboard, but excluding composting), while composting and other biological treatment together accounted for only about 4 percentage point out of the 21 %.

Municipal waste treatment rates in 2011:
- Municipal waste landfilled: 67 %
- Municipal waste incinerated: 11 %
- Municipal waste recycled: 17 %
- Municipal waste composted: 5 %

2. Waste composition

Composition of municipal solid waste (MSW): The composition of produced municipal solid waste has not changed essentially in the last decade. It is estimated that the MSW contains around 13.5 % paper, 20 % plastics, 5.9 % glass and 6.4 % metal (Balatoni, 2012) in Hungary, and around 52 % of the MSW is biodegradable (ETC/SCP, 2008).

3. Legal framework, standards and norms

Waste management plans (WMP) / waste prevention programmes (WPP) already adopted: The legal basis for preparing National Waste Management Plans (NWMP) was introduced in the Hungarian legislation in year 2000 with the Act on Waste Management. National waste management plans are defined for six years according to the legislation.

Title: First National Waste Management Plan 2003-2008
Adopted (in year): 2002
Website: http://www.kvvm.hu/szakmai/hulladekgazd/oht_ang.htm (English)

Title: There is no national WMP in force.
Adopted in (year): n/a

Title: Development Strategy for Municipal Solid Waste Management, 2007-2016
Adopted (in year): 2006

---

Recovery/recycling rates achieved so far per waste stream (at least paper, metal, plastic and glass): 74

<table>
<thead>
<tr>
<th>Waste streams</th>
<th>Recovery rate, 2001 (%)</th>
<th>Recycling rate, 2011 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total packaging waste:</td>
<td>62.9</td>
<td>59.3</td>
</tr>
<tr>
<td>Paper and board packaging:</td>
<td>95.3</td>
<td>94</td>
</tr>
<tr>
<td>Metal packaging:</td>
<td>83.5</td>
<td>83.5</td>
</tr>
<tr>
<td>Plastic packaging:</td>
<td>49.1</td>
<td>37.3</td>
</tr>
<tr>
<td>Glass packaging:</td>
<td>41.2</td>
<td>41.2</td>
</tr>
</tbody>
</table>

Source: Eurostat, 2011

Reduction targets for biodegradable municipal waste (BMW) achieved (2006, 2009, later): 75

Hungary has made rapid progress towards diversion of BMW from landfill. Interim targets set for 2006 and 2009 by the Landfill Directive, were met with achieving a reduction to 66 % in 2006 and 46 % in 2009, mainly due to a dramatic increase in material recovery, MBT and due to an improved separate paper (and packaging paper) collection system.

74 Note: Recycling/recovery targets to be achieved by 2020: 50% (by weight) preparing for re-use and recycling of waste materials such as at least paper, metal, plastic and glass from households and other origins similar to households (Waste Framework Directive 2008/98/EC).

75 Note: Article 5(2) of the Landfill Directive 99/31/EC requires the reduction of biodegradable municipal waste going to landfills to:

- 75% by 16 July 2006
- 50% by 16 July 2009 and
- 35% by 16 July 2015

calculated on the basis of the total amount of biodegradable municipal produced in 1995 or the latest year before 1995 for which standardised Eurostat data is available. Member States that landfilled more than 80 % of their municipal waste in 1995 may postpone each of the targets by a maximum of four years.
Although the interim targets of the Landfill Directive for 2006 and 2009 have been met by Hungary, the country may face some challenges in terms of meeting the 35 % reduction target by 2016

**National strategy for the reduction of biodegradable waste going to landfills** (due 16 July 2003):

Title: Strategy for the Management of Biodegradable Waste in Municipal Solid Waste Management 2004-2016
Adopted in (year): 2003

Title: National Biowaste Programme (2005-2008)
Adopted (in year): 2005

The programme aims to promote the diversion of BMW from landfills. The order of priority is to reduce BMW by recycling (paper), composting, biogas generation, MBT and thermal utilization (KvVM, 2005). The programme was aimed at gradually extending the system to include garden waste, green waste from public parks, organic kitchen waste and paper by 2008.

A ban on landfilling of untreated waste was implemented in 2002. The purpose of this key direct legal measure is to achieve a proper ratio and composition of the waste landfilled, to be in compliance with the Landfill Directive and divert waste streams from landfills to incineration and recovery.

---

76 Municipal waste management in Hungary, ETC/SCP, February 2013
National bodies responsible for MSW management:
- National Waste Management Agency (OHÜ, http://www.szelektivinfo.hu) - established in early 2012, it acts as a single national coordinator between the collection companies and the treatment plants. OHÜ is responsible for preparing the National Collection and Utilization Plan.
13. Ireland (IE)

**General information**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Population (in millions):</td>
<td>4.6</td>
</tr>
<tr>
<td>Total amount of MW (kt)/ year:</td>
<td>2,800</td>
</tr>
<tr>
<td>Total amount of MW (kg)/ person:</td>
<td>623</td>
</tr>
<tr>
<td>Average income (GDP)/ capita in EUR:</td>
<td>33,800</td>
</tr>
</tbody>
</table>

List of 15 largest cities:

1. Dublin (1,110,627)
2. Cork (198,582)
3. Limerick (91,454)
4. Galway (76,778)
5. Waterford (51,519)
6. Drogheda (38,578)
7. Dundalk (37,816)
8. Swords (36,924)
9. Bray (31,872)
10. Navan (28,559)
11. Ennis (25,360)
12. Kilkenny (24,423)
13. Tralee (23,693)
14. Carlow (23,030)
15. Newbridge (21,561)

1. Waste management practice

**Collection schemes in place for MSW:** An estimated 29% of occupied Irish households do not use or were not offered, a kerbside collection service in 2010 (Irish EPA, 2012a). Moreover, according to a recent regulatory impact analysis the current regulatory system for waste collection services renders a system with a number of weaknesses including low rates of householder participation, insufficient levels of segregation of household waste, and pricing structures which do not incentivise sustainable behaviours. This is in part due to lack of control over whether the conditions included in waste collection permits are being adhered to.

**Separate collection of recyclables (paper, metal, plastic, glass):** By 2010, 95% of households serviced by waste collection had a separate bin for collection of dry recyclable wastes i.e. glass, plastic, metal containers and packaging waste.

**Separate collection of organic waste:** Although 34% of serviced Irish households were given a separate dustbin for collection of organic waste in 2010, up from 24% in 2009 this only led to a marginal increase in separate collection from 62 447 tonnes in 2009 to 63 836 tonnes in 2010 (Irish EPA, 2012a). This is in part due to lack of control over the waste collection market in Ireland and reduced numbers of households that are serviced.

**Waste treatment** (dominating practices per country: recycling, landfilling, incineration) in % and tons/year:

Total recycling: 36% (2010) 41% (2011):
- Material recovery: 32%
- Organic recycling: 3.8% (95% of organic recycling takes place within Irish borders)
Landfilled: 53% (2010), 55% (2011)
Incineration: 3.8% (2010), 5% (2011)

Municipal waste treatment rates (2011): 77
- Municipal waste landfilled: 55 %
- Municipal waste incinerated: 5 %
- Municipal waste recycled: 37 %
- Municipal waste composted: 4 %

2. Waste composition

Composition of municipal solid waste (MSW):

Table 2.1: Collected household waste composition profile (% by weight)

<table>
<thead>
<tr>
<th>Waste streams</th>
<th>Mixed residual waste (black bin)</th>
<th>Mixed dry recyclables (green bin)</th>
<th>Mixed organics (brown bin)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMW Content</td>
<td>61.6% 126</td>
<td>72.9% 55</td>
<td>93.6% 2 10</td>
<td>65%</td>
</tr>
<tr>
<td>Weight %</td>
<td>Weight %</td>
<td>Weight %</td>
<td>Weight %</td>
<td></td>
</tr>
<tr>
<td>Organic waste</td>
<td>24.0%</td>
<td>1.3%</td>
<td>28.5%</td>
<td>16.6%</td>
</tr>
<tr>
<td>Garden waste</td>
<td>8.5%</td>
<td>0.1%</td>
<td>50.8%</td>
<td>8.1%</td>
</tr>
<tr>
<td>Papers</td>
<td>12.5%</td>
<td>54.0%</td>
<td>9.8%</td>
<td>19.0%</td>
</tr>
<tr>
<td>Cardboards</td>
<td>3.6%</td>
<td>15.3%</td>
<td>0.5%</td>
<td>6.0%</td>
</tr>
<tr>
<td>Composites</td>
<td>1.0%</td>
<td>2.2%</td>
<td>0.1%</td>
<td>1.0%</td>
</tr>
<tr>
<td>Textiles</td>
<td>7.3%</td>
<td>1.1%</td>
<td>0.5%</td>
<td>5.6%</td>
</tr>
<tr>
<td>Nappies</td>
<td>8.4%</td>
<td>0.4%</td>
<td>0.8%</td>
<td>5.4%</td>
</tr>
<tr>
<td>Plastics</td>
<td>13.6%</td>
<td>15.5%</td>
<td>1.8%</td>
<td>12.4%</td>
</tr>
<tr>
<td>Glass</td>
<td>3.3%</td>
<td>2.3%</td>
<td>0.2%</td>
<td>8.5%</td>
</tr>
<tr>
<td>Metals</td>
<td>3.1%</td>
<td>4.0%</td>
<td>0.1%</td>
<td>3.7%</td>
</tr>
<tr>
<td>Hazardous waste</td>
<td>0.9%</td>
<td>0.5%</td>
<td>0.0%</td>
<td>0.9%</td>
</tr>
<tr>
<td>WEEE</td>
<td>0.3%</td>
<td>0.2%</td>
<td>0.0%</td>
<td>1.8%</td>
</tr>
<tr>
<td>Unclassified combustibles</td>
<td>1.4%</td>
<td>0.2%</td>
<td>0.7%</td>
<td>1.7%</td>
</tr>
<tr>
<td>Unclassified incombustibles</td>
<td>1.2%</td>
<td>0.2%</td>
<td>0.1%</td>
<td>1.6%</td>
</tr>
<tr>
<td>Fines smaller than 20mm</td>
<td>11.7%</td>
<td>2.4%</td>
<td>6.0%</td>
<td>7.8%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>

3. Legal framework, standards and norms

Waste management plans (WMP) / waste prevention programmes (WPP) already adopted: 78

Title: A Resource Opportunity – Waste Management Policy in Ireland
Adopted in (year): 2012

Recovery/recycling rates achieved so far per waste stream (at least paper, metal, plastic and glass): 79
Compliance with the 50% recycling target in the Waste Framework Directive has been achieved in Ireland by selecting the first accounting method: that 50 % by weight of paper, metal,

77 Eurostat Commission - STAT/1333, 4 March 2013
79 Note: Recycling/recycling targets to be achieved by 2020: 50% (by weight) preparing for re-use and recycling of waste materials such as at least paper, metal, plastic and glass from households and other origins similar to households (Waste Framework Directive 2008/98/EC).
plastic and glass wastes from households be prepared for reuse and recycling. According to this method, Ireland has a recycling rate of 53%.

2011 Eurostat data on recycling of packaging waste:

- Paper – 91.5%
- Metal – 66.6%
- Plastic – 47.5%
- Glass – 81.2%

<table>
<thead>
<tr>
<th>Waste streams</th>
<th>Recovery rate, 2001 (%)</th>
<th>Recycling rate, 2011 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total packaging waste:</td>
<td>79</td>
<td>70.9</td>
</tr>
<tr>
<td>Paper and board packaging:</td>
<td>91.5</td>
<td>91.5</td>
</tr>
<tr>
<td>Metal packaging:</td>
<td>66.6</td>
<td>66.6</td>
</tr>
<tr>
<td>Plastic packaging:</td>
<td>47.5</td>
<td>47.5</td>
</tr>
<tr>
<td>Glass packaging:</td>
<td>81.2</td>
<td>81.2</td>
</tr>
</tbody>
</table>

Source: Eurostat, 2011

Reduction targets for biodegradable municipal waste (BMW) achieved (2006, 2009, later): 80

National Strategy on Biodegradable Waste proposes that, by 2016, recycling (principally of paper and cardboard waste which cannot be reused) will divert 875 371 tonnes (38.6 %) from landfill with biological treatment (mainly food and garden waste) contributing 442 129 tonnes (19.5 %) to the overall target. Thermal treatment will divert 499 762 tonnes (22 %) of residual waste from landfill by the same date (Irish EPA, 2012e). It also established a longer term target of 80 % diversion of biodegradable waste from landfill.

2009 – 1.2 million t
2010 – 860,000 t \( \rightarrow \) first reduction target achieved

National strategy for the reduction of biodegradable waste going to landfills (due 16 July 2003):

Title: National Strategy on Biodegradable Waste
Adopted in (year): 2006

National bodies responsible for MSW management:
Irish Environmental protection Agency

---

80 Note: Article 5(2) of the Landfill Directive 99/31/EC requires the reduction of biodegradable municipal waste going to landfills to:

- 75% by 16 July 2006
- 50% by 16 July 2009 and
- 35% by 16 July 2016

calculated on the basis of the total amount of biodegradable municipal produced in 1995 or the latest year before 1995 for which standardised Eurostat data is available. Member States that landfilled more than 80 % of their municipal waste in 1995 may postpone each of the targets by a maximum of four years.
14. Italy (IT)

General information

<table>
<thead>
<tr>
<th>Population (in millions):</th>
<th>59.7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total amount of MW (kt)/ year:</td>
<td>32,500</td>
</tr>
<tr>
<td>Total amount of MW (kg)/ person:</td>
<td>535</td>
</tr>
<tr>
<td>Average income (GDP)/ capita in EUR:</td>
<td>25,700</td>
</tr>
</tbody>
</table>

List of 15 largest cities:

<table>
<thead>
<tr>
<th>Rank</th>
<th>City</th>
<th>Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Rome</td>
<td>2,617,175</td>
</tr>
<tr>
<td>2.</td>
<td>Milan</td>
<td>1,242,123</td>
</tr>
<tr>
<td>3.</td>
<td>Naples</td>
<td>962,003</td>
</tr>
<tr>
<td>4.</td>
<td>Turin</td>
<td>872,367</td>
</tr>
<tr>
<td>5.</td>
<td>Palermo</td>
<td>657,651</td>
</tr>
<tr>
<td>6.</td>
<td>Genoa</td>
<td>586,180</td>
</tr>
<tr>
<td>7.</td>
<td>Bologna</td>
<td>371,337</td>
</tr>
<tr>
<td>8.</td>
<td>Florence</td>
<td>358,079</td>
</tr>
<tr>
<td>9.</td>
<td>Bari</td>
<td>315,933</td>
</tr>
<tr>
<td>10.</td>
<td>Catania</td>
<td>293,902</td>
</tr>
<tr>
<td>11.</td>
<td>Venice</td>
<td>261,362</td>
</tr>
<tr>
<td>12.</td>
<td>Verona</td>
<td>252,520</td>
</tr>
<tr>
<td>13.</td>
<td>Messina</td>
<td>243,262</td>
</tr>
<tr>
<td>14.</td>
<td>Padua</td>
<td>206,192</td>
</tr>
<tr>
<td>15.</td>
<td>Trieste</td>
<td>202,123</td>
</tr>
</tbody>
</table>

1. Waste management practice

Collection schemes in place for MSW: The level of separate collection is increasing in all the Italian regions, but Italy as a whole, with 35 % of MSW separate collection in 2010, equal to 11.4 million tonnes, is still far from achieving the national separate collection targets, introduced by Legislative Decree 152/2006 (the 2008 target was 45 %).

Separate collection of recyclables (paper, metal, plastic, glass): Separate collection of packaging waste is common in North Italy, and fairly diffused in South Italy (above all for glass, whose collection is traditional in Italy).

Packaging waste in Italy is mostly managed through the CONAI system (the National Packaging Consortium established by law), and this includes both municipal packaging waste and special (i.e. industrial, commercial) packaging waste. Alternatively, waste owners and producers may establish contractual agreements with private contractors, other than CONAI.

Although separate collection schemes may be varied according to different operational patterns (e.g. monomaterial vs. multimaterial, kerbside vs. road containers, etc.) the need for high-quality is driving the system towards: (i) kerbside collection and (ii) monomaterial collection (with the possible exception of combined collection of plastics and cans, which may be easily separated afterwards).

Separate collection of organic waste: The separate collection of organic waste has increased by a factor of 2.6 in the 2001-2010 period and the separate collection of biodegradable waste as a whole (organic waste, paper, wood, and textiles) represented on average, over the same period, 69 % of the total.
Separate collection of bio-waste is undergoing a fast growth, and is showing to be the main driver to increase separate collection rates and improve waste management on the whole. In some Northern Regions (e.g. Veneto, Piemont) separate collection of bio-waste is widespread, also in large cities; pilot schemes are well established and consistently developed also in Southern Regions, above all in Campania (including large cities such as Salerno and pilot neighborhoods in Naples) but also in many Municipalities in Lazio, Puglia and Sicily.  

**Waste treatment** (dominating practices per country: recycling, landfilling, incineration) in % and tons/year: Italy has traditionally landfilled most of its MSW, even if the landfill rates have constantly decreased between 2001 and 2010 (Eurostat, 2012), a reduction from 67 % to 48 % related to MSW generated (and from 19.7 to 15.4 million tonnes in absolute terms). However, also in this regard, there are substantial differences among regions. In 2010, e.g., Lombardy landfilled 8 % of its generated municipal waste and separate collection represented about 48.5 % of the total produced amount, while Sicily landfilled 93 % of its generated municipal waste (ISPRA, 2012). In general, it can be underlined that regions that are able to couple high separate collection rates with an adequate capacity for MSW processing under different waste treatment options and a market for recycled materials usually show lower landfill levels.

Municipal waste treatment rates in 2011:
- Municipal waste landfilled: 49 %
- Municipal waste incinerated: 17 %
- Municipal waste recycled: 21 %
- Municipal waste composted: 13 %

<table>
<thead>
<tr>
<th>Year</th>
<th>Paper and cardboard</th>
<th>Glass</th>
<th>Plastic</th>
<th>Metals</th>
<th>Wood</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>1 303,3</td>
<td>1 314,90</td>
<td>502</td>
<td>195,3</td>
<td>201,1</td>
<td>3 516,6</td>
</tr>
<tr>
<td>2009</td>
<td>1 263,3</td>
<td>1 569,1</td>
<td>505,7</td>
<td>187,9</td>
<td>201,8</td>
<td>3 727,8</td>
</tr>
<tr>
<td>2010</td>
<td>1 271,9</td>
<td>1 480,9</td>
<td>556,7</td>
<td>159,4</td>
<td>201,1</td>
<td>3 670,0</td>
</tr>
</tbody>
</table>

Source: ISPRA, 2012

3. Legal framework, standards and norms

**Waste management plans (WMP) / waste prevention programmes (WPP) already adopted:** There is no National WMP, since planning is mandated to Regions (and often devolved to Provinces).

Lazio:
http://www.regione.lazio.it/rl_rifiuti/?vw=contenutiDettaglio&cat=1&id=90

---

81 BIPO, 2012, Factsheet for Italy
82 CIRIEC, No.2010/1
Campania:

http://burc.regione.campania.it/eBurcWeb/directServlet?DOCUMENT_ID=27348&ATTACH_ID=33220,
(cURRENTLY UNDER REVISION UPON REQUEST BY THE EUROPEAN COMMISSION, WITH PARTICULAR REFERENCE TO MEASURES TO COVER THE “TRANSITIONAL” PERIOD UNTIL INFRASTRUCTURE IS FULLY ESTABLISHED)

Puglia:

http://www.arpa.puglia.it/c/document_library/get_file?uuid=d132559f-2b9f-40b9-bac1-d64908b127ab&groupId=13879 (UNDER REVISION)

Calabria:


Sicilia:

http://www.regione.sicilia.it/presidenza/ucomrifiuti/piano/piano_index.htm

(THIS HAS BEEN THOROUGHLY REVISED, THE NEW REGIONAL WASTE PLAN IS AWAITING APPROVAL BY THE NATIONAL GOVERNMENT; AN OLD DRAFT MAY BE RETRIEVED FROM:

http://www.regioni.it/upload/Revisione_Piano_di_gestione_14.10.2010%5B1%5D%5B1%5D.pdf, although this was subject to further changes upon agreement between the Region and the National Government)

Recovery/recycling rates achieved so far per waste stream (at least paper, metal, plastic and glass): 84

<table>
<thead>
<tr>
<th>Waste streams</th>
<th>Recovery rate, 2001 (%)</th>
<th>Recycling rate, 2011 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total packaging waste:</td>
<td>74</td>
<td>64.5</td>
</tr>
<tr>
<td>Paper and board packaging:</td>
<td>87.5</td>
<td>79.5</td>
</tr>
<tr>
<td>Metal packaging:</td>
<td>71.6</td>
<td>71</td>
</tr>
<tr>
<td>Plastic packaging:</td>
<td>68</td>
<td>36.1</td>
</tr>
<tr>
<td>Glass packaging:</td>
<td>69.2</td>
<td>69.2</td>
</tr>
</tbody>
</table>

Source: Eurostat, 2011

Both material recycling and organic recycling have increased between 2001 and 2010, passing from 12 % to 23 % and from 5 % to 13 % respectively.

Reduction targets for biodegradable municipal waste (BMW) achieved (2006, 2009, later): 85

Although Italy, which landfilled 82 % of its BMW in 1995, could have got a 4-year derogation period from the Landfill Directive targets, it decided not to request a derogation. Moreover, instead of transposing the percentage-based targets set out in the Landfill Directive, Italy adopted targets based

---

Note: Recycling/recovery targets to be achieved by 2020: 50% (by weight) preparing for re-use and recycling of waste materials such as at least paper, metal, plastic and glass from households and other origins similar to households (Waste Framework Directive 2008/98/EC).

Note: Article 5(2) of the Landfill Directive 99/31/EC requires the reduction of biodegradable municipal waste going to landfills to:

- 75% by 16 July 2006
- 50% by 16 July 2009
- 35% by 16 July 2016

calculated on the basis of the total amount of biodegradable municipal produced in 1995 or the latest year before 1995 for which standardised Eurostat data is available. Member States that landfilled more than 80 % of their municipal waste in 1995 may postpone each of the targets by a maximum of four years.
on the quantity (kilograms) of BMW produced per capita, which shall be reached at ATO level (Optimal Management Areas) or provincial level (if the ATO is not yet delimited). That decision was based on two core reasons: the lack of reliable data on the quantity of biodegradable municipal waste landfilled in 1995 and the need to implement improved monitoring at the local level (EEA, 2009).

Targets have been defined for 2008, 2011 and 2018, since Italy transposed the Landfill Directive into national law in January 2003, i.e. 18 months after the deadline. As such the targets follow the intervals of the Directive with a delay of two years.

The 2006 target of the EU Landfill Directive has been met, while the 2009 one has not. In fact, in 2009 Italy landfilled 57 % of BMW produced in 1995 and 54 % in 2010.

According to ISPRA (2012), in 2010, the 2008 national target had been met by 10 out of 20 Regions (Piemonte, Lombardy, Veneto, Friuli Venezia Giulia, Trentino Alto Adige, Emilia Romagna, Tuscany, Campania, Calabria, and Sardinia) and the 2011 target by 5 Regions (Lombardy, Veneto, Friuli Venezia Giulia, Trentino Alto Adige, and Emilia Romagna).

**Figure 3.1 Landfilling of biodegradable MSW in Italy**

Legislative Decree 36/2003 transposed the Landfill Directive. It required Regions to elaborate and approve a proper programme for reducing the amount of biodegradable waste going to landfills, integrating the regional waste management plan, in order to achieve specific targets at ATO level
(Optimal Management Areas) or provincial level (if the ATO is not yet delimited). The targets to be reached are the following:

- Before 27 March 2008: landfill of biodegradable municipal waste must be reduced to below 173 kg per inhabitant per year;
- Before 27 March 2011: landfill of biodegradable municipal waste must be reduced to below 115 kg per inhabitant per year; and
- Before 27 March 2018: landfill of biodegradable municipal waste must be reduced to below 81 kg per inhabitant per year.

The same Decree also introduced a landfill ban for waste with a calorific value exceeding 13 megajoules per tonne with effect from the beginning of 2007. This deadline was then shifted to the end of 2008.

National bodies responsible for MSW management:
- State (Central Government, Ministry of Environment) - defines general strategies and sectoral policies.
- National EPA (ISPRA, former ANPA/APAT) - provides technical support to policy-making; it also surveys and monitors effects of waste policy and the need for additional specific Acts and regulations.
- National Observatory on Waste (ONR) - publishes the National Annual Waste Report (primary source of waste statistics).
- Regions - mandated to define Waste Management Plans and Waste Prevention Plans (often “devolved” down to Provinces).
- Regional EPAs (ARPAs) - provide technical support in definition of Regional provisions, monitoring the plans and the single waste treatment/disposal sites, assessing compliance with permits.
- Provinces - may be mandated by Regional Policy to define Waste Management Plans and to deal with permitting procedures.
- Provincial Waste Observatories (OPRs) – provinces monitor and report to OPRs.

---

86 Municipal waste management in Italy, ETC/SCP, February 2013
15. Latvia (LV)

### General information

<table>
<thead>
<tr>
<th>Population (in millions):</th>
<th>2.02</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total amount of MW (kt)/ year:</td>
<td>721</td>
</tr>
<tr>
<td>Total amount of MW (kg)/ person:</td>
<td>350</td>
</tr>
<tr>
<td>Average income (GDP)/ capita in EUR:</td>
<td>10,900</td>
</tr>
</tbody>
</table>

**List of 15 largest cities:**

1. Rīga (658 640)
2. Daugavpils (93 312)
3. Liepāja (76 731)
4. Jelgava (59 511)
5. Jūrmala (50 840)
6. Ventspils (38 750)
7. Rēzekne (32 328)
8. Valmiera (25 130)
9. Jēkabpils (24 635)

### 1. Waste management practice

**Collection schemes in place for MSW:** Considering the collection coverage of 85 %, approximately 15 % of the population is not included in the waste collection system. Currently municipal waste collection schemes are running in parallel with packaging waste collection schemes and collection schemes of environmentally harmful goods. The infrastructure for separate collection of municipal waste is still in the developing phase.

**Separate collection of recyclables (paper, metal, plastic, glass):** Separate collection infrastructure is under development. It is planned to increase the connection rate of inhabitants to a waste collection system from about 60 % in 2005 to 90 % in 2013. At present, 80 % of the urban population are connected to the collection system.

**Separate collection of organic waste:** Separate collection infrastructure is under development.

**Waste treatment** (dominating practices per country: recycling, landfiling, incineration) in % and tons/year: Around 90 % of MSW generated is still being landfilled. Significant amounts of sorted municipal waste are exported from Latvia for recovery in other Member States (in particular metals). Around 9 % of MSW are recycled. MSW composed: 1% 87, 88

Municipal waste treatment rates in 2011:
- Municipal waste landfilled: 88 %
- Municipal waste incinerated: 1 %
- Municipal waste recycled: 10 %
- Municipal waste composted: 1 %

---

87 Eurostat news release 48/2012, Landfill still accounted for nearly 40% of municipal waste treated in the EU27 in 2010, 27 March 2012
88 BiPRO (2012)
2. Waste composition

Composition of municipal solid waste (MSW):

Table 2.1. The composition of municipal waste during years 1998-2000; 2003-2005 and 2007-2008

<table>
<thead>
<tr>
<th>Type of waste</th>
<th>Typical, % by weight 2007-2008</th>
<th>Range</th>
<th>Typical, % by weight 2003-2005</th>
<th>Range</th>
<th>Typical, % by weight 1998-2000</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paper/cardboard</td>
<td>17,3</td>
<td>9-25</td>
<td>12,54</td>
<td>12-15</td>
<td>14,5</td>
<td>10-18</td>
</tr>
<tr>
<td>Biodegradable waste (garden and kitchen waste)</td>
<td>35,4</td>
<td>26-40</td>
<td>36,74</td>
<td>20-52</td>
<td>49,5</td>
<td>36-58</td>
</tr>
<tr>
<td>Plastics</td>
<td>14,3</td>
<td>6-19</td>
<td>9,9</td>
<td>8-12</td>
<td>4,8</td>
<td>2-7</td>
</tr>
<tr>
<td>Metal</td>
<td>2,6</td>
<td>1-4</td>
<td>4,46</td>
<td>3-6</td>
<td>3,7</td>
<td>2-6</td>
</tr>
<tr>
<td>Glass</td>
<td>8,9</td>
<td>6-11</td>
<td>13,0</td>
<td>7-26</td>
<td>13,3</td>
<td>8-22</td>
</tr>
<tr>
<td>Others</td>
<td>25,3</td>
<td>21-33</td>
<td>23,2</td>
<td>17-31</td>
<td>14,1</td>
<td>6-30</td>
</tr>
</tbody>
</table>

Figure 2.1. Composition of MSW in Riga: 89

89 Comparative analysis of municipal waste management in selected European capitals
Table 2.2. Waste composition of Getlini landfill

<table>
<thead>
<tr>
<th>Fraction</th>
<th>Municipal waste % of weight</th>
<th>Industrial waste %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glass</td>
<td>8</td>
<td>3</td>
</tr>
<tr>
<td>Paper</td>
<td>16</td>
<td>10</td>
</tr>
<tr>
<td>Cardboard</td>
<td>5</td>
<td>12</td>
</tr>
<tr>
<td>Plastic</td>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td>Food waste</td>
<td>25</td>
<td></td>
</tr>
<tr>
<td>Garden waste</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Metals</td>
<td>3</td>
<td>9</td>
</tr>
<tr>
<td>Rubber, leather</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Wood</td>
<td>3</td>
<td>30</td>
</tr>
<tr>
<td>Textiles</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Residues</td>
<td>20</td>
<td>26</td>
</tr>
</tbody>
</table>

Dry substance content in municipal waste is estimated to be 62%. The corresponding organic content is estimated to be 39% of the total waste mass. Of the organic content, 62% is considered to be biodegradable (or 24% of total weight).

3. Legal framework, standards and norms

Waste management plans (WMP) / waste prevention programmes (WPP) already adopted: 90

Title: National Waste Management Plan (Atkritumu apsaimniekošanas valsts plans) 2006 - 2012. The purpose of this plan is to prevent waste generation and to promote recycling of waste. In Latvia, policy planning regarding waste management is carried out at national and regional level. Adopted in (year): 2005

The new National Waste Management plan for the period 2013–2020 has been drafted by relevant institutions.

Latvia is divided into 10 waste management regions. For each of the regions there are regional waste management plans elaborated and adopted in the Cabinet of Ministers. Each of the regional waste management plans comprises different measures responding to the needs of 30 particular waste management in the region.

Further development of waste management planning in Latvia are issued by preparation of State Waste management plan for 2013-2020 (including waste prevention programme) – approval by Cabinet of Ministers by the end of 2012 and preparation of Regional Waste Management Plans for 2014 –2020 – approval of Cabinet of Ministers by the end of 2013. 91

---

Recovery/recycling rates achieved so far per waste stream (at least paper, metal, plastic and glass): 92

<table>
<thead>
<tr>
<th>Waste streams</th>
<th>Recovery rate, 2001 (%)</th>
<th>Recycling rate, 2011 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total packaging waste:</td>
<td>53.7</td>
<td>50.9</td>
</tr>
<tr>
<td>Paper and board packaging:</td>
<td>75.3</td>
<td>75.2</td>
</tr>
<tr>
<td>Metal packaging:</td>
<td>79.1</td>
<td>74.3</td>
</tr>
<tr>
<td>Plastic packaging:</td>
<td>35</td>
<td>23</td>
</tr>
<tr>
<td>Glass packaging:</td>
<td>51.6</td>
<td>51.6</td>
</tr>
</tbody>
</table>

Source: Eurostat, 2011

Reduction targets for biodegradable municipal waste achieved (2006, 2009, later): 93 The estimated amount of landfilled BMW in 2010 increased to 397 525 tons (equivalent to 86 % of the quantity generated in 1995). The 2010 target of 75 % seems to have not been achieved.

Huge efforts have to be undertaken in Latvia to fulfill the 50 % target by 2013 and the 35 % target by 2020.

National strategy for the reduction of biodegradable waste going to landfills (due 16 July 2003): Current waste management plans contain targets for municipal waste management until 2020 (EEA, 2010), namely to decrease the amount of landfilled biodegradable waste in accordance with the Landfill Directive.

Reduction of Biodegradable Municipal Waste disposal in waste polygons.

National bodies responsible for MSW management:
- Cabinet of Ministers - approve State waste management plan; regional waste management plans; and regulations on waste management.
- Ministry of Environmental Protection and Regional Development – prepare and co-ordinate the implementation of the Waste Management State Plan and Regional waste management plans (in co-operation with municipalities).
- State Environmental Service and its Regional Environmental Boards – provide practical implementation and enforcement of waste management legislation; control and supervision of the implementation of waste related legislation.
- Latvian Environment, Geology and Meteorology Center – provide compilation and processing of waste management data and statistics.

Note: Recycling/recovery targets to be achieved by 2020: 50% (by weight) preparing for re-use and recycling of waste materials such as at least paper, metal, plastic and glass from households and other origins similar to households (Waste Framework Directive 2008/98/EC).

Note: Article 5(2) of the Landfill Directive 99/31/EC requires the reduction of biodegradable municipal waste going to landfills to:
- 75% by 16 July 2006
- 50% by 16 July 2009 and
- 35% by 16 July 2016

calculated on the basis of the total amount of biodegradable municipal produced in 1995 or the latest year before 1995 for which standardised Eurostat data is available. Member States that landfilled more than 80 % of their municipal waste in 1995 may postpone each of the targets by a maximum of four years.
- State Environmental Supervision Bureau - prepares programs for EIA on waste management projects.
- Municipalities (110 municipalities and 9 cities) – organise the management of municipal waste, including separate collection of municipal waste; take decision of location of new waste recovery and disposal facilities; participate in preparation of regional waste management plans.
16. Lithuania (LT)

General information

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Population</strong> (in millions):</td>
<td>2.9</td>
</tr>
<tr>
<td><strong>Total amount of MW (kt)/ year:</strong></td>
<td>1,399</td>
</tr>
<tr>
<td><strong>Total amount of MW (kg)/ person:</strong></td>
<td>442</td>
</tr>
<tr>
<td><strong>Average income (GDP)/ capita in EUR:</strong></td>
<td>11,000</td>
</tr>
</tbody>
</table>

List of 15 largest cities:
(Indicate city & population, rank in order of size)
1. Vilnius (539,939)
2. Kaunas (304,097)
3. Klaipėda (157,350)
4. Šiauliai (105,653)
5. Panevėžys (96,345)
6. Alytus (56,364)
7. Marijampolė (39,542)
8. Mažeikiai (36,278)
9. Jonava (34,056)
10. Utena (28,391)
11. Kėdainiai (26,080)
12. Telšiai (24,500)
13. Visaginas (20,238)
14. Tauragė (24,043)
15. Ukmergė (22,904)

1. Waste management practice

**Collection schemes in place for MSW:** Not all of Lithuania is covered by a municipal waste collection scheme. Around 80% of the population was covered in 2007, rising to 94% in 2010. The remainder of the population is provided with other forms of collection services (e.g. civic amenity sites).

**Separate collection of recyclables** (paper, metal, plastic, glass): There are around 20,000 containers for recyclable materials and 77 bulky waste collection sites currently operating (70 were constructed using 2004-2006 EU funds and seven with 2007-2013 EU funding; an additional 45 bulky waste collection sites are planned for construction with 2007-2013 EU funding).

At the beginning of 2009, municipal waste collection services were provided by 104 companies. The majority of the costs for the collection and treatment of the main streams are covered by producers/importers.

**Separate collection of organic waste:** The long term objectives of the Lithuanian waste policy, among others, is to ensure municipal biodegradable waste collection and treatment. Special bins for home composting are provided for owners of private houses almost in the entire country. It is planned to deliver 157,899 containers (boxes) for biodegradable waste composting in private households.

**Waste treatment** (dominating practices per country: recycling, landfilling, incineration) in % and tons/year: The vast majority of municipal waste in Lithuania is still landfilled. In 2010, 1.08 million tonnes were landfilled compared with 1.25 million tonnes in 2007 and 1.15 million tonnes in 2004. Based on the information from the Environmental Protection Agency, 1.25 million tonnes of municipal waste was generated in 2010. 62,500 tonnes were recycled (including compost) in Lithuania, and 96,000 tonnes exported for recycling.
The total recycling only increased from 2% in 2004 to 5% in 2010. The increase of total recycling is primarily linked to material recycling which has increased from 1.1% in 2004 to 3.4% in 2010 (in absolute amounts from 14,000 tonnes to 43,000 tonnes). Organic recycling has only increased from 0.8% to 1.5% in the same period (or from 10,000 tonnes to 19,000 tonnes). Consequently, there is room for improving both material and organic recycling, and it seems that organic recycling in particular can be improved. 94

Municipal waste treatment rates in 2011:
- Municipal waste landfilled: 79%
- Municipal waste incinerated: 1%
- Municipal waste recycled: 19%
- Municipal waste composted: 2%

2. Waste composition

Composition of municipal solid waste (MSW):

Table 2.1. The composition of waste in Kaunas region 2003

<table>
<thead>
<tr>
<th>Waste category</th>
<th>Kg/person/year</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food / kitchen</td>
<td>132</td>
<td>39</td>
</tr>
<tr>
<td>Green waste</td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td>Paper</td>
<td>54</td>
<td>16</td>
</tr>
<tr>
<td>Plastic</td>
<td>24</td>
<td>7</td>
</tr>
<tr>
<td>Glass</td>
<td>31</td>
<td>9</td>
</tr>
<tr>
<td>Metal</td>
<td>10</td>
<td>3</td>
</tr>
<tr>
<td>Non incinerated</td>
<td>17</td>
<td>5</td>
</tr>
<tr>
<td>Incinerated</td>
<td>48</td>
<td>14</td>
</tr>
<tr>
<td>Hazardous</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Bulky</td>
<td>14</td>
<td>4</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>340</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

3. Legal framework, standards and norms

Waste management plans (WMP) / waste prevention programmes (WPP) already adopted: 96

Title: National Strategic Waste Management Plan 2007 – 2013 (Valstybinis Strateginis Atliekų Tvarkymo Planas) 97
Adopted in (year): 2007, amended in December 2010
Website: http://www3.lrs.lt/pls/inter3/dokpaieska.showdoc ?p_id=388766&p_query=&p_tr2=2&p_hil=&p_sess=&p_no=1%20 (Lithuanian)

---

94 Municipal waste management in Lithuania, ETC/SCP, February 2013
95 Waste Management in Lithuania

National Strategic Waste Management Plan 2014 – 2020 is under consideration.

**Recovery/recycling rates achieved so far per waste stream** (at least paper, metal, plastic and glass): 98

<table>
<thead>
<tr>
<th>Waste streams</th>
<th>Recovery rate, 2001 (%)</th>
<th>Recycling rate, 2011 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total packaging waste:</td>
<td>62.9</td>
<td>62.2</td>
</tr>
<tr>
<td>Paper and board packaging:</td>
<td>83.7</td>
<td>83.7</td>
</tr>
<tr>
<td>Metal packaging:</td>
<td>68.4</td>
<td>68.4</td>
</tr>
<tr>
<td>Plastic packaging:</td>
<td>38.9</td>
<td>38.9</td>
</tr>
<tr>
<td>Glass packaging:</td>
<td>74.1</td>
<td>74.1</td>
</tr>
</tbody>
</table>

Source: Eurostat, 2011

**Reduction targets for biodegradable municipal waste (BMW) achieved (2006, 2009, later):** 99

Lithuania has reported its landfilled amount of BMW to the European Commission for the years 2007, 2008 and 2009. In 2007, the landfilled amount was 745 000 tonnes (equivalent to 97 % of the generated amount in 2000).

Lithuania estimates the percentage of landfilled BMW in 2010 to be about 81 % of the amount generated in 2000 (Lithuania, 2012). This is not sufficient to fulfil the 75 % target that Lithuania should meet in 2010.

---

98 **Note:** Recycling/recovery targets to be achieved by 2020: 50% (by weight) preparing for re-use and recycling of waste materials such as at least paper, metal, plastic and glass from households and other origins similar to households (Waste Framework Directive 2008/98/EC).

99 **Note:** Article 5(2) of the Landfill Directive 99/31/EC requires the reduction of biodegradable municipal waste going to landfills to:
- 75% by 16 July 2006
- 50% by 16 July 2009 and
- 35% by 16 July 2016

calculated on the basis of the total amount of biodegradable municipal produced in 1995 or the latest year before 1995 for which standardised Eurostat data is available. Member States that landfilled more than 80 % of their municipal waste in 1995 may postpone each of the targets by a maximum of four years.
Figure 3.1. Landfilling of biodegradable MSW in Lithuania

![Graph showing landfilling of biodegradable MSW in Lithuania](image)

Source: EC, 2012 and Lithuania 2012. The target dates take account of Lithuania’s 4 years derogation period.

Figure 3.1. indicates that it will take an extraordinary effort for Lithuania to fulfil the 50 % and 35 % Landfill Directive targets by 2013 and 2020, respectively.

National strategy for the reduction of biodegradable waste going to landfills (due 16 July 2003):
The disposal of biodegradable waste from gardens, parks and greeneries is banned according to the Order of the Minister of Environment No 444 on the Rules on Construction, Operation, Closure and After Care of Landfills of Waste, adopted 18/10/2000 with the last amendments in 2010 (Žin., 2000, No 96-3051; 2010, No 79-4111). The transition period for this ban is no later than till the 2013. Such ban will encourage the establishment of sorting, composting, incineration and other waste treatment plants.

National bodies responsible for MSW management:
- Ministry of Environment - responsible for legislation and administration in the field of waste management, coordinating the activities of the State, regional and local institutions and preparing the National Strategy Waste Management Plan.
- Environment Protection Agency - organizes, coordinates and performs the state environmental monitoring, provides methodological help for Regional Environment Protection Departments.
- Municipalities (10 regions, 60 municipalities) – organise the municipal waste management, responsible for reaching EU targets regarding recycling and recovery, set out the terms of municipal waste collection, transport, treatment and disposal, ensure that the waste treatment installations function. Most municipalities have joined waste management cooperation structures.
- Municipal Councils - approve municipal waste management service fees.
- Regional waste management centres - coordinate waste management in neighbouring municipalities in their region. There is an Association of Regional waste management centres in Lithuania. Regional waste management centres are the legal entities established by several municipalities. Those municipalities, who are owners of regional waste management centres, cooperate in order to improve waste management system and to create waste management infrastructure.
17. Montenegro (ME)

General information

<table>
<thead>
<tr>
<th>Population (in millions):</th>
<th>0.6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total amount of MW (kt)/ year:</td>
<td>193,148</td>
</tr>
<tr>
<td>Total amount of MW (kg)/ person:</td>
<td>365</td>
</tr>
<tr>
<td>Average income (GDP)/ capita in EUR:</td>
<td>7130</td>
</tr>
</tbody>
</table>

List of 15 largest cities:
(Indicate city & population, rank in order of size)

1. Podgorica (136,473)
2. Nikšić (58,212)
3. Pljevlja (21,377)
4. Bijelo Polje (15,883)
5. Cetinje (15,137)
6. Bar (13,719)
7. Herceg Novi (12,739)
8. Berane (11,776)
9. Budva (10,918)
10. Ulcinj (10,828)
11. Rožaje (9,567)
12. Tivat (9,467)
13. Dobrota (8,169)
14. Kotor (5,341)
15. Danilovgrad (5,208)

1. Waste management practice

Collection schemes in place for MSW: A comparable frequent collection service is established in almost every municipality. In most of the municipalities (10) the collection service is provided at least daily, even in very small towns. The most common system is MSW collection with 1,1 m³ containers. More than two third of them are old and damaged.

Separate collection of recyclables (paper, metal, plastic, glass): There is no separate collection of recyclables.

Separate collection of organic waste: There is no separate collection of organic waste.

Waste treatment (dominating practices per country: recycling, landfilling, incineration) in % and tons/year:

Waste treatment and recycling:
In the entire country of Montenegro there is no MW treatment plant under operation currently. In Montenegro currently the activities regarding waste recycling are at a low degree. In Podgorica 5 collection centres are installed to improve the recycling system.

In 2002 and 2003 following amounts of raw materials were separately collected:
Waste disposal:
20 municipalities dispose the collected waste on own disposal sites. None of these disposal sites was selected under environmental sound aspects and does not contain any technical measurements e.g. liners to reduce or avoid environmental damages. At all disposal sites the collected waste is directly dumped on the land without any protective measurements.

2. Waste composition

Composition of municipal solid waste (MSW): In the Strategic Master Plan, the amounts of different components of waste are shown in the following table:

Table 2.1. Municipal Waste Generation Montenegro 2008-2012 (tonnes)

<table>
<thead>
<tr>
<th>Composition</th>
<th>Year</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paper and cardboard</td>
<td>2008</td>
<td>38 994</td>
<td>39 981</td>
<td>41 051</td>
<td>42 153</td>
<td>43 291</td>
</tr>
<tr>
<td>Organics</td>
<td>2009</td>
<td>51 877</td>
<td>52 133</td>
<td>52 393</td>
<td>52 658</td>
<td>52 928</td>
</tr>
<tr>
<td>Textiles</td>
<td>2010</td>
<td>10 211</td>
<td>10 464</td>
<td>10 724</td>
<td>10 992</td>
<td>11 269</td>
</tr>
<tr>
<td>Plastics</td>
<td>2011</td>
<td>24 573</td>
<td>25 198</td>
<td>25 842</td>
<td>26 507</td>
<td>27 191</td>
</tr>
<tr>
<td>Metals</td>
<td>2012</td>
<td>8 813</td>
<td>9 038</td>
<td>9 270</td>
<td>9 509</td>
<td>9 756</td>
</tr>
<tr>
<td>Glass</td>
<td>2008</td>
<td>16 229</td>
<td>16 651</td>
<td>17 087</td>
<td>17 536</td>
<td>17 999</td>
</tr>
<tr>
<td>Others</td>
<td>2009</td>
<td>46 303</td>
<td>46 573</td>
<td>46 847</td>
<td>47 124</td>
<td>47 405</td>
</tr>
<tr>
<td>Total</td>
<td>2010</td>
<td>197 000</td>
<td>200 038</td>
<td>203 214</td>
<td>206 479</td>
<td>209 839</td>
</tr>
</tbody>
</table>

3. Legal framework, standards and norms

Waste management plans (WMP) / waste prevention programmes (WPP) already adopted: 100

Title: Strategic Master Plan for Solid Waste Management
Website: http://www.epa.org.me/images/dokumenti/waste%20%20master%20plan.pdf

The Master Plan envisages the construction of seven regional landfills for municipal waste to serve all 21 municipalities in Montenegro, rehabilitation of the existing waste disposal sites, improvements in waste collection systems including enhancement of recycling schemes, as well as improvements in management and disposal of specific waste types.

Title: National Waste Management Plan 2008-2012
Adopted in (year): 2008
The National Plan defines waste management objectives and provides conditions for rational and sustainable waste management for the next five years.

A new National Waste Management Plan 2013-2018 with an associated Implementation Action Plan will be developed to ensure Montenegro has a clear and sustainable road map for compliance with the EU Waste Management Legislation.\(^{101}\)

**Recovery/recycling rates achieved so far per waste stream** (at least paper, metal, plastic and glass): \(^{102}\) The Government of Montenegro should adopt Regulation on limit values of ingredients, method of production, manufacturing, labelling, handling and use, how to establish and monitor the quality of packaging, electrical and electronic equipment, batteries and vehicles this year (2011). Draft version of this regulation is prepared.

**Reduction targets for biodegradable municipal waste (BMW) achieved (2006, 2009, later):** \(^{103}\) n/a

**National strategy for the reduction of biodegradable waste going to landfills** (due 16 July 2003):
There is a clear need for investment is waste management infrastructure, both for solid waste landfills sites and waste water treatment. This has been identified as a priority by the Government. There is also a need to address hazardous waste disposal. There is currently no viable disposal mechanism and at present this waste is stored. As the volume produced in-country are small, a dedicated facility for Montenegro may not be feasible, and a regional solution is likely to be more appropriate.

**National bodies responsible for MSW management:**
- Ministry of Sustainable Development and Tourism
- Environmental Protection Agency

\(^{101}\) The European environment – state and outlook 2010, (Waste) Montenegro, EEA

\(^{102}\) **Note:** Recycling/recovery targets to be achieved by **2020:** 50% (by weight) preparing for re-use and recycling of waste materials such as at least paper, metal, plastic and glass from households and other origins similar to households (Waste Framework Directive 2008/98/EC).

\(^{103}\) **Note:** Article 5(2) of the Landfill Directive 99/31/EC requires the reduction of biodegradable municipal waste going to landfills to:
- 75% by 16 July 2006
- 50% by 16 July 2009 and
- 35% by 16 July 2016

calculated on the basis of the total amount of biodegradable municipal produced in 1995 or the latest year before 1995 for which standardised Eurostat data is available. Member States that landfilled more than 80 % of their municipal waste in 1995 may postpone each of the targets by a maximum of four years.
18. Netherlands (NL)

General information

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Population (in millions)</td>
<td>16.8</td>
</tr>
<tr>
<td>Total amount of MW (kt)/year</td>
<td>9,947</td>
</tr>
<tr>
<td>Total amount of MW (kg)/person</td>
<td>596</td>
</tr>
<tr>
<td>Average income (GDP)/capita in EUR</td>
<td>35,800</td>
</tr>
</tbody>
</table>

List of 15 largest cities:
(Indicate city & population, rank in order of size)
1. Amsterdam (808,032)
2. Rotterdam (616,042)
3. The Hague (508,634)
4. Utrecht (220,836)
5. Tilburg (209,788)
6. Groningen (198,123)
7. Almere (195,845)
8. Breda (179,823)
9. Nijmegen (167,613)
10. Enschede (158,589)
11. Apeldoorn (157,510)
12. Haarlem (154,600)
13. Arnhem (150,673)
14. Amersfoort (150,608)

1. Waste management practice

Collection schemes in place for MSW: Waste is collected by local authority cleansing departments or waste collection companies. There are also numerous municipal waste recycling centres where people can take their waste. Each municipality operates its own waste collection system: some work with wheeled bins and underground containers, in other municipalities waste bags can be put out.104

Separate collection of recyclables (paper, metal, plastic, glass): Majority of municipal waste is collected separately. A voluntary deposit refund scheme is in place on large single use Polyethylene terephthalate (PET) bottles, glass beer bottles and for the corresponding plastic crates (Statiegeld).

Separate collection of organic waste: Organic waste separation is good from a climate perspective, but not necessarily the best economic solution.

Waste treatment (dominating practices per country: recycling, landfilling, incineration) in % and tons/year: The Netherlands is a frontrunner in recycling in Europe, having managed over the last years to divert more than half of the MSW generated in 2010 to material and organic recycling. Out of the 9.8 million tonnes of MSW generated in 2010, 5 million tonnes were recycled, 3.2 million tonnes were incinerated (with or without energy recovery) and only 0.03 million tonnes ended up in the landfills.

Municipal waste treatment rates in 2011:
- Municipal waste landfilled: 1 %
- Municipal waste incinerated: 38 %
- Municipal waste recycled: 32 %
- Municipal waste composted: 28 %

104 Dutch Waste Management Association
2. Waste composition

Composition of municipal solid waste (MSW):

Table 1: Composition of recycled municipal waste in the Netherlands 2001-2010 in 1000 tonnes

<table>
<thead>
<tr>
<th>Recycling of MSW</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paper and cardboard</td>
<td>1 013</td>
<td>1 006</td>
<td>982</td>
<td>1 027</td>
<td>1 045</td>
<td>1 081</td>
<td>1 106</td>
<td>1 124</td>
<td>1 077</td>
<td>1 063</td>
</tr>
<tr>
<td>Glass</td>
<td>335</td>
<td>342</td>
<td>341</td>
<td>342</td>
<td>338</td>
<td>341</td>
<td>344</td>
<td>349</td>
<td>345</td>
<td>351</td>
</tr>
<tr>
<td>Cartons for beverages</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Metal packaging</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Plastic packaging</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>6</td>
<td>6</td>
<td>8</td>
<td>26</td>
<td>82</td>
</tr>
<tr>
<td>Other plastics</td>
<td>:</td>
<td>:</td>
<td>:</td>
<td>:</td>
<td>:</td>
<td>:</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>WEEE</td>
<td>53</td>
<td>57</td>
<td>61</td>
<td>67</td>
<td>71</td>
<td>70</td>
<td>74</td>
<td>81</td>
<td>82</td>
<td>84</td>
</tr>
<tr>
<td>Metals from household waste</td>
<td>75</td>
<td>76</td>
<td>77</td>
<td>77</td>
<td>77</td>
<td>81</td>
<td>83</td>
<td>82</td>
<td>83</td>
<td>73</td>
</tr>
<tr>
<td>Furniture</td>
<td>14</td>
<td>24</td>
<td>28</td>
<td>38</td>
<td>35</td>
<td>40</td>
<td>39</td>
<td>38</td>
<td>38</td>
<td>38</td>
</tr>
<tr>
<td>Bulky garden waste</td>
<td>353</td>
<td>396</td>
<td>377</td>
<td>397</td>
<td>406</td>
<td>407</td>
<td>452</td>
<td>426</td>
<td>444</td>
<td>452</td>
</tr>
<tr>
<td>Wood</td>
<td>246</td>
<td>273</td>
<td>283</td>
<td>310</td>
<td>318</td>
<td>341</td>
<td>349</td>
<td>342</td>
<td>326</td>
<td>323</td>
</tr>
<tr>
<td>Organic, kitchen and garden waste</td>
<td>1 404</td>
<td>1 406</td>
<td>1 340</td>
<td>1 407</td>
<td>1 362</td>
<td>1 296</td>
<td>1 315</td>
<td>1 289</td>
<td>1 302</td>
<td>1 256</td>
</tr>
</tbody>
</table>

3. Legal framework, standards and norms

Waste management plans (WMP) / waste prevention programmes (WPP) already adopted:

Adopted in (year): 2009
Website: http://www.lap2.nl/sn_documents/downloads/01%20Beleidskader/versie%202010-02%20%281e%20wijziging%29/beleidskader-00-compleet_2010-02-16.pdf

Recovery/recycling rates achieved so far per waste stream (at least paper, metal, plastic and glass):

The Netherlands has already fulfilled the target of 50 % by 2020. Since 2007, recycling accounted for 50 % of the total MSW generated and it increased to 51 % in 2010. The trend remains positive and recycling of MSW could reach 55 % to 60 % by 2020 if the increase rates of the recent years are maintained.

---

105 Source: Statistics Netherlands, 2012
107 Note: Recycling/recovery targets to be achieved by 2020: 50% (by weight) preparing for re-use and recycling of waste materials such as at least paper, metal, plastic and glass from households and other origins similar to households (Waste Framework Directive 2008/98/EC).
Regional differences of MSW recycling (2001-2010):

- **Total recycling**: The region with the highest amount of generated MSW is South Holland (Zuid Holland), including major cities such as the Hague and Rotterdam, which is also one of the biggest ports in whole of Europe.

  It is remarkable that **Limburg** has reached recycling levels as high as 60% of MSW, recycling 412,000 tonnes in 2008. Although in South Holland the amount of MSW recycled was almost the double of that in Limburg, still the recycling rate is low compared to other Dutch regions, reaching only 38% in 2008.

- **Material recycling** is increasing steadily. **Zeeland** has the highest material recycling rates at 33% while South Holland has achieved a recycling rate of 23%.

- In **organic recycling**, there is a big difference (20%) between **Drenthe** which has the best performance in the country, and **South Holland** which is the worst performer that also produces the highest amount of MSW. This could be partly explained by the fact that **Drenthe** is mainly a rural area where more organic waste is expected to arise and therefore organic waste management systems are likely to have been put in place to enable the recovery of organic matter.

<table>
<thead>
<tr>
<th>Waste streams</th>
<th>Recovery rate, 2001 (%)</th>
<th>Recyclin rate, 2011 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total packaging waste</td>
<td>95.2</td>
<td>71.9</td>
</tr>
<tr>
<td>Paper and board packaging</td>
<td>99.5</td>
<td>88.6</td>
</tr>
<tr>
<td>Metal packaging</td>
<td>91.2</td>
<td>91.2</td>
</tr>
<tr>
<td>Plastic packaging</td>
<td>98.2</td>
<td>50.7</td>
</tr>
<tr>
<td>Glass packaging</td>
<td>82.8</td>
<td>82.8</td>
</tr>
</tbody>
</table>

*Source: Eurostat, 2011*

Reduction targets for biodegradable municipal waste (BMW) achieved (2006, 2009, later): ¹⁰⁸ The targets are related to generated amount of BMW in 1995, in which the Netherlands generated 2,406,000 tonnes of BMW. In 2006 the Netherlands had already reached the targets of the Landfill Directive for 2006, 2009 and 2016 and that no further effort is required.

National strategy for the reduction of biodegradable waste going to landfills (due 16 July 2003): In 1995, the Dutch government issued a waste decree that introduced a landfill ban for 35 waste categories (ETC/SCP, 2009) including all combustible and biodegradable waste. As a result, no BMW would under those circumstances go to landfill. Nevertheless, the decree enables the provincial authorities to grant an exemption from the landfill ban to operators of landfills (for example, if there is a temporary shortage of incineration capacity). However, the provincial authority is only allowed to do so if it has obtained a statement from the national environmental authorities indicating that at that time in the Netherlands no other processing option other than landfill is available for that particular waste (EEA, 2002).

¹⁰⁸ **Note**: Article 5(2) of the Landfill Directive 99/31/EC requires the reduction of biodegradable municipal waste going to landfills to:
- 75% by 16 July 2006
- 50% by 16 July 2009 and
- 35% by 16 July 2016

calculated on the basis of the total amount of biodegradable municipal produced in 1995 or the latest year before 1995 for which standardised Eurostat data is available. Member States that landfilled more than 80% of their municipal waste in 1995 may postpone each of the targets by a maximum of four years.
National bodies responsible for MSW management:
- Government / Ministry of Environment: financial instruments, tax on landfilling, producer responsibility for a number of products and rate differentiation (‘Pay-as-you-throw-scheme’) in the collection of household waste.
- Provinces: licensing and monitoring of waste treatment facilities (including incineration and landfilling); the regulation of waste prevention in individual licenses; responsible (financially, administratively and organizationally) for the environmental rehabilitation of closed landfills sites.
- Municipalities: collection of household waste in their own territory. Authorities are obliged to collect organic household waste separately, door-to-door, though there may be deviations in specific circumstances. Local authority bylaws mainly include rules on disposal of household waste, for example, which components have to be kept separate, frequency of waste collection and the agencies carrying out collection.
Norway (NO)

General information

<table>
<thead>
<tr>
<th>Population (in millions):</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total amount of MW (kt)/ year:</td>
<td>2,295</td>
</tr>
<tr>
<td>Total amount of MW (kg)/ person:</td>
<td>483</td>
</tr>
<tr>
<td>Average income (GDP)/ capita in EUR:</td>
<td>72,750</td>
</tr>
</tbody>
</table>

List of 15 largest cities:
(Indicate city & population, rank in order of size)
1. Oslo (925,242)
2. Bergen (238,098)
3. Stavanger/Sandnes (201,353)
4. Trondheim (167,598)
5. Fredrikstad/Sarpsborg (105,545)
6. Drammen (101,995)
7. Porsgrunn/Skien (88,860)
8. Kristiansand (70,204)
9. Tromso (57,015)
10. Tønsberg (49,093)
11. Ålesund (48,460)
12. Haugesund (44,524)
13. Moss (43,553)
14. Sandefjord (42,212)
15. Bodø (38,326)

1. Waste management practice

Collection schemes in place for MSW: A new regulation which came into force on 1 July 2004 changed the responsibility of the municipalities. Previously, the municipalities had the responsibility for household waste and household-like waste from the enterprises. Under the new regulation, the municipalities are responsible only for household waste.

Separate collection of recyclables (paper, metal, plastic, glass): The separate collection rate was 53% for household waste in 2010. The amount collected separately is not equal to the amount recycled as some of the waste fractions, e.g. hazardous waste, is not collected for recycling.

Separate collected household waste (1000 tonnes) in Norway (data source SSB 2012 and SSB 2005)

<table>
<thead>
<tr>
<th></th>
<th>2004</th>
<th>2005</th>
<th>2008</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paper, paper packaging</td>
<td>271</td>
<td>299</td>
<td>335</td>
<td>295</td>
</tr>
<tr>
<td>Glass</td>
<td>41</td>
<td>44</td>
<td>49</td>
<td>51</td>
</tr>
<tr>
<td>Plastic</td>
<td>8</td>
<td>9</td>
<td>18</td>
<td>25</td>
</tr>
<tr>
<td>Metal</td>
<td>53</td>
<td>54</td>
<td>64</td>
<td>68</td>
</tr>
</tbody>
</table>

Separate collection of organic waste: The amount of separately collected organic waste (green kitchen waste, wood and garden waste) has increased significantly from 2000 to 2010.

Separate collected household waste (1000 tonnes) in Norway (data source SSB 2012 and SSB 2005)

<table>
<thead>
<tr>
<th></th>
<th>2004</th>
<th>2005</th>
<th>2008</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green kitchen waste</td>
<td>156</td>
<td>152</td>
<td>172</td>
<td>172</td>
</tr>
<tr>
<td>Wood</td>
<td>113</td>
<td>129</td>
<td>176</td>
<td>191</td>
</tr>
<tr>
<td>Garden waste</td>
<td>110</td>
<td>112</td>
<td>140</td>
<td>163</td>
</tr>
</tbody>
</table>
Norway is a country with a small population but it has a large geographical area with many smaller communities. It seems that the regional waste policies do not have a large effect on material recycling of MSW but first of all on organic recycling.

**Waste treatment** (dominating practices per country: recycling, landfilling, incineration) in % and tons/year:

Municipal waste treatment rates in 2011:

- Municipal waste landfilled: 2 %
- Municipal waste incinerated: 57 %
- Municipal waste recycled: 25 %
- Municipal waste composted: 15 %

Recycling: 42% (967,000 t) in 2010

- organic recycling: 16% (358,000 t) in 2010 – including composting and other biological treatment
- material recycling: 27% (609,000 t) in 2010

Regional differences of MSW recycling:

1. Recycling in the region with the highest generated total amount of MSW in 2009:
   - Oslo & Akershus – 34% (organic recycling: 9%)

2. Recycling in the region with the lowest percentage of recycling in 2009:
   - Material recycling varies from 23 % in Nord-Norge to 32 % in Trøndelag → sparsely populated; therefore, infrastructure for recycling is difficult and more costly

3. Recycling in the region with the highest percentage of recycling in 2009:
   - Hedmark & Oppland – 53% (organic recycling: 27%)

The difference (between regions 1 & 3) results from the availability of kerbside collection of green kitchen waste (30% & 26% in Oslo and Akershus; 64% & 90% in Hedmark and Oppland)

Landfilling: 6% (137,000 t) in 2010 & a landfill ban was introduced in 2009 → 2% in 2011

Incineration: 50% (1,154,000 t) in 2010, with 1,080,000 t exported for incineration in Sweden

The landfill tax seems to have had some impact on the incineration of MSW. The incinerated amount of MSW increased from 30 % to 50 % from 2001 to 2010. In addition to the landfill tax, Norway also has had a tax on incineration of waste. The tax was introduced in 1999 and abolished on 1 October 2010. The introduction of the landfill ban in 2009 combined with no incineration tax from 2010 seems to have increased the amount of waste incinerated.

Material recovery and biological treatment (e.g. composting) comprised 4.2 million tonnes, or 39 per cent, while energy recovery counted for 29 per cent.

The national goal for waste recovery is that 75 per cent of the total quantity of waste was to be recovered in 2010, this target has been reached since 2004. The proportion is subsequently to be raised to 80 per cent.
2. Waste composition

Composition of municipal solid waste (MSW):

57.5% - packaging waste (Eurostat, 2011)
Hazardous waste disposed of at specially designed landfills makes up more than one third of the landfilled volumes. The remaining amounts were concrete, glass, plastic, etc.
Bio-waste is less than 20%

3. Legal framework, standards and norms

Waste management plans (WMP) / waste prevention programmes (WPP) already adopted: 109

Title: The Government’s Environmental Policy and the State of the Environment in Norway
Adopted in (year): 2007
Website: [http://www.regjeringen.no/pages/2094393/PDFS/STM200620070026000EN_PDFS.pdf](http://www.regjeringen.no/pages/2094393/PDFS/STM200620070026000EN_PDFS.pdf)

The White Paper from 2007 issued by the Norwegian Government outlines the national waste targets and the instruments needed to reach them. This is an analogue to a national waste management plan, apart from that it does not have a legal reference. The national target was to increase the percentage of total waste being recycled to 75 % in 2010 with an aspiration to increase it further to 80 % (Regjeringen, 2007).

Landfill ban 2009
A new provision in the Waste Regulations(1) has introduced a ban on landfill of biodegradable waste, which entered into force on July 1 2009. This applies to waste that contains 10 % TOC or more.

Tax on incineration of waste – introduced in 1999 and abolished in 2010 (as a result of Sweden’s abolition of the same tax)

Recovery/recycling rates achieved so far per waste stream (at least paper, metal, plastic and glass): 110

<table>
<thead>
<tr>
<th>Waste streams</th>
<th>Recovery rate, 2001 (%)</th>
<th>Recycling rate, 2011 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total packaging waste:</td>
<td>88.1</td>
<td>57.5</td>
</tr>
<tr>
<td>Paper and board packaging:</td>
<td>98.6</td>
<td>84.9</td>
</tr>
<tr>
<td>Metal packaging:</td>
<td>79.2</td>
<td>78.9</td>
</tr>
<tr>
<td>Plastic packaging:</td>
<td>91.2</td>
<td>37.6</td>
</tr>
<tr>
<td>Glass packaging:</td>
<td>87.4</td>
<td>87.4</td>
</tr>
</tbody>
</table>

Source: Eurostat, 2011

Reduction targets for biodegradable municipal waste (BMW) achieved (2006, 2009, later): 111 n/a


110 Note: Recycling/recycling targets to be achieved by 2020: 50% (by weight) preparing for re-use and recycling of waste materials such as at least paper, metal, plastic and glass from households and other origins similar to households (Waste Framework Directive 2008/98/EC).

111 Note: Article 5(2) of the Landfill Directive 99/31/EC requires the reduction of biodegradable municipal waste going to landfills to:
- 75% by 16 July 2006
- 50% by 16 July 2009
- 35% by 16 July 2016
National strategy for the reduction of biodegradable waste going to landfills (due 16 July 2003):

Title: Regulations relating to the recycling of waste (Waste Regulations)
Adopted in (year): 2004, with later amendments
Website: http://www.miljodirektoratet.no/no/Regelverk/Forskrifter/Regulations-relating-to-the-recycling-of-waste-Waste-Regulations/

Norway's regulatory framework for waste management (Avfallsforskriften 2004) was revised and simplified in 2004. New instruments were applied to curb waste generation and stimulate waste recovery, including several taxes on landfill and incineration. The 2004 regulation changed the scope of municipal waste to include only household waste.

National bodies responsible for MSW management:
- National Government – responsible for the adoption of a national waste management plan
- County Governors
- Municipalities
- Ministry of Petroleum and Energy – responsible for a financial support scheme to increase utilization of energy from waste treatment, in particular to address treatment of biodegradable waste.

calculated on the basis of the total amount of biodegradable municipal produced in 1995 or the latest year before 1995 for which standardised Eurostat data is available. Member States that landfilled more than 80 % of their municipal waste in 1995 may postpone each of the targets by a maximum of four years.
20. Poland (PL)

General information

<table>
<thead>
<tr>
<th>Population (in millions):</th>
<th>38.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total amount of MW (kt)/ year:</td>
<td>12,129</td>
</tr>
<tr>
<td>Total amount of MW (kg)/ person:</td>
<td>315</td>
</tr>
<tr>
<td>Average income (GDP)/ capita in EUR:</td>
<td>9,900</td>
</tr>
</tbody>
</table>

List of 15 largest cities:

1. Warsaw (1,715,517)
2. Kraków (758,463)
3. Łódź (718,960)
4. Wrocław (631,188)
5. Poznań (550,742)
6. Gdańsk (460,427)
7. Szczecin (408,913)
8. Bydgoszcz (361,254)
9. Lublin (347,678)
10. Katowice (307,233)
11. Białystok (294,921)
12. Gdynia (248,726)
13. Częstochowa (234,472)
14. Radom (219,703)
15. Sosnowiec (213,513)

1. Waste management practice

Collection schemes in place for MSW:

**Separate collection of recyclables** (paper, metal, plastic, glass): Green Dot scheme for packaging waste is introduced in 2002. The scheme has a national coverage and it targets all packaging operators (packaging manufacturers as well as packers and fillers). Separate collection of paper/cardboard is introduced in 2002. No Pay-as-you-throw (PAYT) scheme has been identified in Poland. Waste collection system has been reformed and it is under responsibility of municipalities to organize separate collection from households and institutions of wastes of paper, metal, plastic, glass and composite packages since 1 January 2012 (entered into force on 1 January 2012).

**Separate collection of organic waste:** Within their administrative territory the municipalities has the obligation to organize separate collection of biodegradable municipal waste including biodegradable packaging (entered into force on 1 January 2012). Chapter 3 in the Polish Waste Management Plan for 2010-2014 prescribes that the 50 % recycling-target will be achieved by ‘a very intensive development of separate collection and sorting of municipal waste’.

**Waste treatment** (dominating practices per country: recycling, landfilling, incineration) in % and tons/year: The majority of MSW in Poland is still landfilled. In 2010, the figure was 7.4 million tonnes compared with 10.6 million tonnes in 2001, and 9.2 million tonnes in 2004. In 2010, the generated amount of MSW was 12 million tonnes. The total recycling of MSW increased from 5 % in 2004 to 21 % in 2010. The total increase of recycling is first of all linked to material recycling which has increased from 2 % in 2004 to 15 % in 2010 - or in absolute amounts from 240 000 tonnes to 1 780 000 tonnes. Organic recycling has only increased from 2 % to 7 % in the same period equivalent to an increase from 230 000 tonnes to 790 000 tonnes (2009 and 2010).
Municipal waste management rates in 2011:
- Municipal waste landfilled: 71%
- Municipal waste incinerated: 1%
- Municipal waste recycled: 11%
- Municipal waste composted: 17%

2. Waste composition

Composition of municipal solid waste (MSW):

Figure 2.1. Morphological composition of wastes generated in 2009

![Morphological composition of wastes generated in 2009](image)

Table 2.1.: Composition of recycled municipal waste in Poland in 2008 and 2010 (in 1000 tonnes) ¹¹²

<table>
<thead>
<tr>
<th></th>
<th>2008</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total material recycling</td>
<td>895</td>
<td>1 783</td>
</tr>
<tr>
<td>of which</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Paper and cardboard</td>
<td>145</td>
<td>170</td>
</tr>
<tr>
<td>Glass</td>
<td>175</td>
<td>216</td>
</tr>
<tr>
<td>Plastics</td>
<td>83</td>
<td>124</td>
</tr>
<tr>
<td>Metals</td>
<td>9</td>
<td>17</td>
</tr>
<tr>
<td>Textiles</td>
<td>38</td>
<td>36</td>
</tr>
<tr>
<td>Large size</td>
<td>97</td>
<td>103</td>
</tr>
<tr>
<td>Sorted out from mixed waste</td>
<td>336</td>
<td>1 105</td>
</tr>
<tr>
<td>Total Biological treatment</td>
<td>386</td>
<td>790</td>
</tr>
<tr>
<td>Separately collected</td>
<td>123</td>
<td>181</td>
</tr>
<tr>
<td>Mixed municipal waste biological treated</td>
<td>263</td>
<td>609</td>
</tr>
<tr>
<td>Total recycling</td>
<td>1,281</td>
<td>2 573</td>
</tr>
</tbody>
</table>

¹¹² Municipal waste management in Poland, ETC/SCP, February 2013
### 3. Legal framework, standards and norms

**Waste management plans (WMP) / waste prevention programmes (WPP) already adopted:**


**Title:** The National Waste Management Plan 2011-2014, Outlook 2015-2022 (*Krajowego planu gospodarki odpadami*)

**Adopted in (year):** 2010

**Website:**
- [2010 National Waste management Plan](http://www.mos.gov.pl/g2/big/2009_06/e97e2a07ce29b48c19f462f83a6bf1a9.pdf)

**Recovery/recycling rates achieved so far per waste stream** (at least paper, metal, plastic and glass):

<table>
<thead>
<tr>
<th>Waste streams</th>
<th>Recovery rate, 2001 (%)</th>
<th>Recycling rate, 2011 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total packaging waste</td>
<td>55.9</td>
<td>41.2</td>
</tr>
<tr>
<td>Paper and board packaging</td>
<td>69</td>
<td>58.7</td>
</tr>
<tr>
<td>Metal packaging</td>
<td>45.1</td>
<td>45.1</td>
</tr>
<tr>
<td>Plastic packaging</td>
<td>25.9</td>
<td>22.6</td>
</tr>
<tr>
<td>Glass packaging</td>
<td>45.9</td>
<td>45.0</td>
</tr>
</tbody>
</table>

Source: Eurostat, 2011

**Reduction targets for biodegradable municipal waste (BMW) achieved (2006, 2009, later):**

Poland has reported its landfilled amount of BMW to the Commission for the years 2006, 2007 and 2008. In 2008, the landfilled amount was 4 100 000 tonnes (equivalent to 94 % of the generated amount in 1995).

---


114 **Note:** Recycling/recovery targets to be achieved by 2020: 50% (by weight) preparing for re-use and recycling of waste materials such as at least paper, metal, plastic and glass from households and other origins similar to households (Waste Framework Directive 2008/98/EC).

115 **Note:** Article 5(2) of the Landfill Directive 99/31/EC requires the reduction of biodegradable municipal waste going to landfills to:
  - 75% by 16 July 2006
  - 50% by 16 July 2009 and
  - 35% by 16 July 2016
calculated on the basis of the total amount of biodegradable municipal produced in 1995 or the latest year before 1995 for which standardised Eurostat data is available. Member States that landfilled more than 80 % of their municipal waste in 1995 may postpone each of the targets by a maximum of four years.
Figure 3.1. Landfilling of biodegradable MSW in Poland

In 2010 the percentage of landfilled BMW is estimated to be 84 % related to the generated amount in 1995. However, this level is not sufficient to fulfil the 75 % target according to the EU Landfill Directive.

An extraordinary effort would have to be undertaken if Poland is to fulfil the 50 % and 35 % targets by 2013 and 2020, respectively.

**National strategy for the reduction of biodegradable waste going to landfills** (due 16 July 2003):

Adopted in (year): 2010 National Waste Management Plan
Website: [http://www.mos.gov.pl/g2/big/2009_06/e97e2a07ce29b48c19f462f83a6bf1a9.pdf](http://www.mos.gov.pl/g2/big/2009_06/e97e2a07ce29b48c19f462f83a6bf1a9.pdf)

The objective of biodegradable municipal waste management is to reduce the quantity of waste of such nature.

**National bodies responsible for MSW management:**
- Ministry of the environment – responsible for implementation of waste legislation
- Municipalities – responsible for MSW collection

Source: Municipal Waste Management in Poland, ETC/SCP, February 2013.
* The target dates take account of Poland’s 4 years derogation period.
21. Portugal (PT)

General information

<table>
<thead>
<tr>
<th>Population (in millions):</th>
<th>10.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total amount of MW (kt)/ year:</td>
<td>5,139</td>
</tr>
<tr>
<td>Total amount of MW (kg)/ person:</td>
<td>487</td>
</tr>
<tr>
<td>Average income (GDP)/ capita in EUR:</td>
<td>15,600</td>
</tr>
</tbody>
</table>

List of 15 largest cities:

1. Lisbon (547,631)
2. Porto (237,584)
3. Vila Nova de Gaia (186,503)
4. Amadora (175,135)
5. Braga (143,532)
6. Funchal (111,882)
7. Coimbra (102,455)
8. Setúbal (90,640)
9. Almada (89,533)
10. Agualva-Cacém (79,805)
11. Queluz (75,179)
12. Guimarães (66,912)
13. Viseu (66,143)
14. Rio Tinto (64,815)
15. Aveiro (61,752)

1. Waste management practice

Collection schemes in place for MSW:

Separate collection of recyclables (paper, metal, plastic, glass): Green Dot scheme for packaging and packaging waste (glass, paper/cardboard, plastic, metal and wood) is introduced in 1997.

Separate collection of organic waste: Portugal has set targets for the increase of separate collection of food and garden waste initially only from the main source such as restaurants, canteens, supermarkets and at a later stage also from private households. In future only separately collected biodegradable waste will be composted. Back yard composting will be promoted.

Waste treatment (dominating practices per country: recycling, landfilling, incineration) in % and tons/year:

Portugal generated around 5.5 million tonnes of MSW in 2010, and the treatment is still heavily based on landfilling. In the decade from 2001 to 2010, landfilling remained the dominant option with more than 60 % in all years, but with a decreasing trend. This is mainly due to recycling which has steadily increased to 12 % in 2010. Incineration covers around 20 % while the rest is composted.

Municipal waste management rates in 2011:
- Municipal waste landfilled: 59 %
- Municipal waste incinerated: 21 %
- Municipal waste recycled: 12 %
- Municipal waste composted: 8 %
2. Waste composition

**Composition of municipal solid waste (MSW):**


<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Organics</td>
<td>35</td>
<td>36</td>
<td>34</td>
<td>36</td>
</tr>
<tr>
<td>Paper</td>
<td>23</td>
<td>24</td>
<td>21</td>
<td>24</td>
</tr>
<tr>
<td>Textile and others</td>
<td>23</td>
<td>21</td>
<td>23</td>
<td>21</td>
</tr>
<tr>
<td>Plastics</td>
<td>12</td>
<td>11</td>
<td>11</td>
<td>11</td>
</tr>
<tr>
<td>Metal</td>
<td>3</td>
<td>2</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Glass</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>6</td>
</tr>
</tbody>
</table>

3. Legal framework, standards and norms

**Waste management plans (WMP) / waste prevention programmes (WPP) already adopted:**

Portugal will aim to cut landfilling by 20% by 2020 and increase recycling collections by 30%, according to its latest municipal waste plan. Press release and draft waste plan (both in Portuguese)

Portugal will aim to cut landfilling by 20% by 2020 and increase recycling collections by 30%, according to its latest municipal waste plan. The plan, which should achieve an annual recycling rate of 47 kilos per person by 2020, or 53%, will require an extension of pay-as-you-throw charges and higher landfill taxes, the ministry said. There is a €320m budget for expanding recycling collections, improving the technology in separation plants and launching a pilot biogas project.

Adopted in (year): 2006

---

116 Analysis of the Portuguese Municipal Solid Waste Management System. 2012
Recovery/recycling rates achieved so far per waste stream (at least paper, metal, plastic and glass):  

<table>
<thead>
<tr>
<th>Waste streams</th>
<th>Recovery rate, 2001 (%)</th>
<th>Recycling rate, 2011 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total packaging waste</td>
<td>62.9</td>
<td>58.4</td>
</tr>
<tr>
<td>Paper and board packaging</td>
<td>75.2</td>
<td>71.3</td>
</tr>
<tr>
<td>Metal packaging:</td>
<td>71</td>
<td>71</td>
</tr>
<tr>
<td>Plastic packaging:</td>
<td>38.1</td>
<td>26.1</td>
</tr>
<tr>
<td>Glass packaging:</td>
<td>59.7</td>
<td>59.7</td>
</tr>
</tbody>
</table>

Source: Eurostat, 2011

Reduction targets for biodegradable municipal waste (BMW) achieved (2006, 2009, later):  The targets are related to the generated amount of BMW in 1995, in which Portugal generated around 2250 000 tonnes BMW. Portugal has reported the landfilled amount of BMW to the European Commission for the years 2007, 2008 and 2009 (EC, 2012).

Portugal has set targets for the increase of separate collection of food and garden waste initially only from the main source such as restaurants, canteens, supermarkets and at a later stage also from private households. In future only separately collected biodegradable waste will be composted. Backyard composting will be promoted.

Figure 3.1 shows the landfilling levels of biodegradable MSW in Portugal between 2006 and 2010 related to the generated amount in 1995, as well as the distance to the Landfill Directive targets.

---

**Note:** Recycling/recovery targets to be achieved by 2020: 50% (by weight) preparing for re-use and recycling of waste materials such as at least paper, metal, plastic and glass from households and other origins similar to households (Waste Framework Directive 2008/98/EC).

**Note:** Article 5(2) of the Landfill Directive 99/31/EC requires the reduction of biodegradable municipal waste going to landfills to:
- 75% by 16 July 2006
- 50% by 16 July 2009 and
- 35% by 16 July 2016

calculated on the basis of the total amount of biodegradable municipal produced in 1995 or the latest year before 1995 for which standardised Eurostat data is available. Member States that landfilled more than 80% of their municipal waste in 1995 may postpone each of the targets by a maximum of four years.
Figure 3.1. Landfilling of biodegradable MSW in Portugal

According to the graph, Portugal achieved the target for 2006 (75% of the generated amount of BMW in 1995) with the exact necessary percentage. However, the BMW landfilled has increased since then.

**National strategy for the reduction of biodegradable waste going to landfills** (due 16 July 2003):

Title: National strategy for the reduction of biodegradable waste going to landfill / ERB - Estratégia Nacional para a Reduceção de Resíduos Urbanos Biodegradáveis destinados a Aterros
Adopted in (year): 2004
Website: [http://bdjur.almedina.net/citem.php?field=item_id&value=1147880](http://bdjur.almedina.net/citem.php?field=item_id&value=1147880)

In order to reduce BMW going to landfills the National Strategy has established the next priorities to be promoted in Portugal:  

- the reduction of waste through small scale composting projects
- increase of separate collection of food waste and garden waste
- construction of new plants for organic recycling through anaerobic digestion and/or composting and the improve of the existing plants
- production of good compost (from separate collection of food waste and green waste) and an standard on compost quality will be published
- increase of separate collection of cardboard/paper
- construction of a new incinerator

---

120 Eionet, 2009
Portugal has invested in organic waste recovery facilities (including MBT technology) and has eradicated all uncontrolled landfilling within its territory.

In 2010, 10 new MBT plants become operational.

**National bodies responsible for MSW management:**
- The Ministry of the Environment is responsible for all waste legislation.
- Municipalities which are responsible for collection of (normally only mixed) waste;
- SGRSU which are entities dealing with waste treatment;
- SPV which is the Portuguese Green Dot System responsible for recycling packaging wastes.
22. Romania (RO)

### General information

<table>
<thead>
<tr>
<th>Population (in millions):</th>
<th>20.1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total amount of MW (kt)/ year:</td>
<td>7,800</td>
</tr>
<tr>
<td>Total amount of MW (kg)/ person:</td>
<td>365</td>
</tr>
<tr>
<td>Average income (GDP)/ capita in EUR:</td>
<td>6,200</td>
</tr>
</tbody>
</table>

| List of 15 largest cities : |
| (Indicate city & population, rank in order of size) |
| 1. Bucharest (1,883,425) |
| 2. Cluj-Napoca (324,576) |
| 3. Timișoara (319,279) |
| 4. Iași (290,422) |
| 5. Constanța (283,872) |
| 6. Craiova (269,506) |
| 7. Brașov (253,200) |
| 8. Galați (249,342) |
| 9. Ploiești (209,945) |
| 10. Oradea (196,367) |
| 11. Brăila (180,302) |
| 12. Arad (159,704) |
| 13. Pitești (155,383) |
| 14. Sibiu (147,245) |
| 15. Bacău (144,307) |

### 1. Waste management practice

**Collection schemes in place for MSW:** By 2009, 63% of the population in Romania benefited from collection services; this consisted of 84% in the urban areas and only 38% in rural areas. A total of 6.296 million tonnes of waste was collected and treated in 2009.

*Separate collection of recyclables (paper, metal, plastic, glass):* Green Dot scheme for packaging waste was introduced in 2004. There is a tradition for separately collecting paper waste in Romania. The market for selective waste collection services is quite fragmented, with more than 1,000 companies having been licensed nationally for the collection of packaging waste. The paper/cardboard and metal waste management have by far the most efficient recovery and recycling systems. 121

**Separate collection of organic waste:** Separate MSW collection practices were adopted in Romania in 2006, through the development of several pilot projects. Following this period, in the period 2007-2017 the municipalities are required to develop a solid infrastructure for this practice, which is expected to boost the recycling levels. Only 75,000 tonnes of MSW have been collected selectively in 2008, and 83,000 tonnes in 2010 according to Eurostat (2012).

**Waste treatment** (dominating practices per country: recycling, landfilling, incineration) in % and tons/year: More than 95% of the total collected municipal waste is landfilled in Romania, with only small amounts being recycled or co-incinerated (NEPA, 2010). In 2010

121 National Waste Management Strategy, 2003-2013
In 2011 for example, from the total amount of MSW collected, only 1% was recycled (Eurostat, 2013):

- Municipal waste landfilled: 99 %
- Municipal waste incinerated: 0 %
- Municipal waste recycled: 1 %
- Municipal waste composted: 1 %

Paper/cardboard is the most recycled material (46.6 % of the recycled waste), which is in large part due to the fact that there are many awareness campaigns in schools and education institutions where paper is collected. The total level of recycling of MSW in Romania is very low and did not increase during the last ten years. The composition of the total quantity of separately collected waste in 2010 can be seen in Table 2.1. Organic waste is recycled in very small amounts, and this is mainly performed by households for their own purposes. In other words, there is room for improving both material and organic recycling of MSW.

2. Waste composition

**Composition of municipal solid waste (MSW):** The average composition of household waste generated in 2002 was the following: 122

- Paper and paperboard: 11 %
- Glass: 5 %
- Metals: 5 %
- Plastic: 10 %
- Textiles: 5 %
- Biodegradable organic waste: 51 %
- Other waste: 13 %

<table>
<thead>
<tr>
<th>Total quantity of collected materials (1000 tonnes)</th>
<th>PET</th>
<th>Plastic</th>
<th>Paper/Cardboard</th>
<th>Glass</th>
<th>Metal</th>
<th>Wood</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>58.24</td>
<td>13.15</td>
<td>7.46</td>
<td>27.19</td>
<td>7.80</td>
<td>1.06</td>
</tr>
</tbody>
</table>

Source: Municipal Waste Management in Romania, ETC/SCP, February 2013

3. Legal framework, standards and norms

**Waste management plans (WMP) / waste prevention programmes (WPP) already adopted:** 123

Title: National Waste Management Plan 2003 – 2013 (Planul National de Gestionare a Deseurilor)
Adopted in (year): 2003, revised every 5 years
Website: [http://www.anpm.ro/upload/3827_PNGD.pdf](http://www.anpm.ro/upload/3827_PNGD.pdf)

English version of the National Waste Management Strategy (2004):

---

In order to increase the efficient implementation of the National Waste Management Plan, Regional Waste Management Plans for the eight Romanian regions were issued in 2006. Based on the specific situation within each region (and within each county from the region), these plans establish the optimum municipal waste management flows, as well as the necessary capacities for waste collection, treatment and disposal, in order to develop integrated systems for municipal waste management at regional levels.

Recovery/recycling rates achieved so far per waste stream (at least paper, metal, plastic and glass): 124

<table>
<thead>
<tr>
<th>Waste streams</th>
<th>Recovery rate, 2001 (%)</th>
<th>Recycling rate, 2011 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total packaging waste:</td>
<td>54.4</td>
<td>50</td>
</tr>
<tr>
<td>Paper and board packaging:</td>
<td>68</td>
<td>65.5</td>
</tr>
<tr>
<td>Metal packaging:</td>
<td>62.3</td>
<td>62.3</td>
</tr>
<tr>
<td>Plastic packaging:</td>
<td>43.2</td>
<td>40.3</td>
</tr>
<tr>
<td>Glass packaging:</td>
<td>60</td>
<td>60</td>
</tr>
</tbody>
</table>

Source: Eurostat, 2011

An exceptional effort from the regional and national Romanian authorities will be needed to increase the recycling level to 50 % by 2020. A similar effort will be required even with a five year derogation period to 2025.

Reduction targets for biodegradable municipal waste (BMW) achieved (2006, 2009, later): 125

Specific targets for diverting biodegradable waste from landfilling – provided by Governmental Decision 349/2005 on the landfill of waste:

- reducing the quantity of landfilled biodegradable municipal waste to 75% from the quantity generated in 1995, by 16th of July 2006;
- reducing the quantity of landfilled biodegradable municipal waste to 50% from the quantity generated in 1995, by 16th of July 2009;
- reducing the quantity of landfilled biodegradable municipal waste to 35% from the quantity generated in 1995, by 16th of July 2016.

For the attainment of targets foreseen in art. 5(2) (a) and (b) of the Directive 1999/31/CE, Romania will apply the provisions of paragraph 3 of art. 5(2) of the Directive on the possibility of postponing the attainment of targets by a period of 4 years, by 16.07.2010 and by 16.07.2013, respectively.

The third target will be attained by the date set out in the Directive - 16.07.2016.

124 Note: Recycling/recovery targets to be achieved by 2020: 50% (by weight) preparing for re-use and recycling of waste materials such as at least paper, metal, plastic and glass from households and other origins similar to households (Waste Framework Directive 2008/98/EC).

125 Note: Article 5(2) of the Landfill Directive 99/31/EC requires the reduction of biodegradable municipal waste going to landfills to:
- 75% by 16 July 2006
- 50% by 16 July 2009 and
- 35% by 16 July 2016

calculated on the basis of the total amount of biodegradable municipal produced in 1995 or the latest year before 1995 for which standardised Eurostat data is available. Member States that landfilled more than 80 % of their municipal waste in 1995 may postpone each of the targets by a maximum of four years.
Specific targets for paper packaging waste recycling - 60% are provided by Governmental Decision 621/2005 on packaging and packaging waste management, modified by Governmental Decision 1872/2006.

In the reference year Romania landfilled 4.80 million tonnes of BMW, and according to data reported to the European Commission, 92% of this amount was treated in the same way in 2006. This percentage dropped to 81% in 2007 and 76% in 2008 (EC, 2012). In 2009, the percentage was 75% (NEPA, 2010) indicating an early fulfilment of the 2010 target.

Figure 5.4 Landfilling of biodegradable MSW in Romania

Source: EC, 2012 and CRI calculation. The figures from 2009 are taken from the NEPA annual report ‘State of the Environment’ (2010). The figures for 2010 are CRI estimations. The target dates take account of Romania’s 4 years derogation period.

National strategy for the reduction of biodegradable waste going to landfills (due 16 July 2003):

Adopted in (year): 2005
Website: http://www.anpm.ro/upload/3827_PNGD.pdf

Romanian strategy for diverting biodegradable waste from landfilling is contained into the National Waste Management Plan. Measures for the Reduction of biodegradable waste are planned, as follows:

- Composting (aerobic digestion) – after separate collection
- Anaerobic digestion with biogas production
- Mechanic-biological - after mixed collection
Reduction of biodegradable waste by separate collection of organic matter (especially green waste) from waste (in less dense urban areas).

Demonstrative facilities will be developed (pilot projects):

- Compost plants: 5,000-10,000 t/year, max. 50,000 t/year each planned
- Total biodegradable waste composting capacity: 680,000-1,000,000 t/year.
- Non-selective collection of biodegradable waste in high density of population areas.
- Mechanical-biological treatment plants: 100,000 t/year
- Building of demonstrative composting and BMT plants.

Results of the pilot projects will be used to extend the system.

National bodies responsible for MSW management:
- Ministry of Environment - develops national policies in the waste management field.
- National Environmental Protection Agency (NEPA) - is the technical body subordinated to the Ministry of Environment, with the following functions: technical support for legal norms, strategies and policies, legislation implementation, coordination of the activities for strategies and policies implementation, representation and permitting.
- Directorate for Waste and Dangerous Chemicals within NEPA - coordinates and monitors implementation of legislation in the waste management field. It assures technical support for the initiation of legal standards and norms.
- 8 Regional Environmental Protection Agency (REPA) - they accomplish at the regional level the NEPA’s responsibilities.
- 42 County Environmental Protection Agency - they collect primary information related to waste generation and management and accomplish at the county level NEPA’s responsibilities.
- Municipalities – responsible for the collection and management of municipal waste.
- National Environmental Guard (NEG) - is the specialised body of the Ministry of Environment, with responsibilities for inspection and control.
23. Serbia (RS)

### General information

<table>
<thead>
<tr>
<th>Population (in millions):</th>
<th>7.2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total amount of MW (kt)/ year:</td>
<td>2,375</td>
</tr>
<tr>
<td>Total amount of MW (kg)/ person:</td>
<td>359</td>
</tr>
<tr>
<td>Average income (GDP)/ capita in EUR:</td>
<td>4,300</td>
</tr>
</tbody>
</table>

**List of 15 largest cities:**

1. Belgrade (1,659,440 inhabitants)
2. Novi Sad (341,625)
3. Niš (260,237)
4. Kragujevac (179,417)
5. Subotica (141,554)
6. Zrenjanin (123,362)
7. Pančevo (123,414)
8. Čačak (115,337)
9. Novi Pazar (100,410)
10. Kraljevo (125,488)
11. Smederevo (108,209)
12. Leskovac (144,206)
13. Valjevo (90,301)
14. Kruševac (128,752)
15. Vranje (82,782)

### 1. Waste management practice

**Collection schemes in place for MSW:** About 60-70 % of MSW (2.2 million tons annually) is collected. Collection is organised primarily in the urban areas (around 58% urban population), whereas the rural areas are significantly less covered. Households generate about 63 % of the municipal waste and businesses about 20 %,\(^\text{126}\) \(^\text{127}\)

Collection of municipal waste is done mainly by public utility companies whose founders are municipalities or towns. Organization of transport and distribution of containers mostly rely on free assessment and earlier practice, rather than on appropriate analyses based on number of gravitating population, frequency of filling and emptying of containers and capacity of vehicles. In some municipalities, collection of waste has been entrusted to private sector.

**Separate collection of recyclables** *(paper, metal, plastic, glass)*: Centers for separate collection of waste exist in Belgrade, Čačak and sporadically in other municipalities. Waste is collected in separate containers by types (metal, glass, paper, PET, cans). For now, there is a facility for waste separation of recyclable waste in Novi Sad. Primary selection of packaging waste is organized in some cities (Čačak). Export of very large quantities of waste that have processing capacities, primarily metals - iron and steel, aluminum and copper. Waste plastics is among imported wastes, although it is generated in sufficient quantities in the country, but organized gathering doesn’t exist. In 2010, the collection of packaging waste has been started in accordance with the Law on Packaging and Packaging Waste.\(^\text{128}\)


\(^{128}\) Implementation of waste management plans in Serbia, 2013 Workshop on Waste Policy Implementation, 30-31 May 2013, Copenhagen
Separate collection of organic waste: There is no organized separate collection of organic waste.

Waste treatment (dominating practices per country: recycling, landfilling, incineration) in % and tons/year: Landfills (dumps) are the primary waste disposal method. Approximately 70% of household waste is collected and mostly ends up untreated in over 4,000 illegal or unmonitored tips or landfills. Municipal waste, including hazardous waste generated by households, is usually disposed directly to landfills. From around registered 180 landfills for municipal waste, only one meets the required standards. 129, 130

Municipal waste treatment rates in 2011:
- Municipal waste landfilled: 100%
- Municipal waste incinerated: 0%
- Municipal waste recycled: 0%
- Municipal waste composted: 0%

2. Waste composition

Detail the composition of municipal solid waste (MSW):

---

130 Source: http://www.giz.de/themen/en/36712.htm

Co-funded by the Eco-innovation Initiative of the European Union
Organic waste (gardening waste and other biodegradable waste) takes up to almost 50% in the mass of municipal waste, whereas the proportion of other biodegradable waste, with 37.62%, is approx. three times more than the gardening waste. Total plastic waste accounts for the total of 12.73%, whereas the total quantity of cardboard amounts to 8.23% followed by glass (5.44%), textile (5.25%), disposable diapers (3.65%) and metal (1.358%).

3. Legal framework, standards and norms

Waste management plans / waste prevention programmes already adopted: 132

Title: National Waste Management Strategy (2010-2019) - it proposes a regional process of area waste planning that includes the formation of 29 Waste Management Regions/districts (WMR), each with an environmental and economic sustainable Waste Management System. It aims to develop local and regional waste management plants by 2013.
Adopted in (year): 2003, revised in 2009

Title: Law on Waste Management - includes the private sector into management of MSW. Municipalities are obliged to develop municipal waste management plans until 2010. They are also obliged to organize themselves into regions for waste management, and develop regional plans. The existing legislation defines local municipalities as the entities responsible for managing communal waste. 133
Adopted in (year): 2009

Local waste management plans (LWMP) insufficiently reflect the local situation and they usually do not set an optimal and complete solutions for the introduction of an integrated waste management at the local level.

Title: National Program of Integration (NPI) - special chapter relates to dynamics in regulations adoption and development of institutional capacities and needs in the area of waste management.
Adopted in (year): 2008

Title: National Strategy of Sustainable Development - it includes objectives of waste production decrease and building of infrastructure for waste management, enactment of regulations and regional and local waste management plans.
Adopted in (year): 2008

133 Implementation of waste management plans in Serbia, 2013 Workshop on Waste Policy Implementation, 30-31 May 2013, Copenhagen
Recovery/recycling rates achieved so far per waste stream: Long-term objective (2014-2018) in the Waste Management Strategy is to achieve the level of re-use and recycling of packaging material waste (glass, paper, carton, metal and plastic) of 25% of its volume.

Reduction targets for biodegradable municipal waste achieved (2006, 2009, later): There are goals in government policy regarding reduction of biodegradable waste, and they are stated in The Regulation of Waste Disposal, but their application will start in year 2016. In period from 2012 to 2016, at least 25% less (in weight) of biodegradable waste will be disposed at landfills. By 2019 this number needs to be at least 50% and by 2026 this number needs to rise at least to 65%. With Regulation Establishing a Plan to Reduce Packaging Waste national goals for recycling and reusing of waste are determined and the goals are 25% of recycled waste and 30% of waste to be reused by the year 2014.

National bodies responsible for MSW management:
- Ministry for Energy, Development and Environmental Protection
- Competent authority of the autonomous province
- Competent authority of the local self-government unit
- Serbian Environmental Protection Agency (SEPA)
- Serbian Solid Waste Association (SeSWA)
- Professional waste testing organizations
- Environmental Protection Fund
- Non-governmental organizations, including consumers’ organizations

Note: Recycling/recovery targets to be achieved by 2020: 50% (by weight) preparing for re-use and recycling of waste materials such as at least paper, metal, plastic and glass from households and other origins similar to households (Waste Framework Directive 2008/98/EC).

Note: Article 5(2) of the Landfill Directive 99/31/EC requires the reduction of biodegradable municipal waste going to landfills to:
- 75% by 16 July 2006
- 50% by 16 July 2009 and
- 35% by 16 July 2016
calculated on the basis of the total amount of biodegradable municipal produced in 1995 or the latest year before 1995 for which standardised Eurostat data is available. Member States that landfill more than 80 % of their municipal waste in 1995 may postpone each of the targets by a maximum of four years.

24. Slovak Republic (SK)

General information

<table>
<thead>
<tr>
<th>Population (in millions):</th>
<th>5.4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total amount of MW (kt)/ year:</td>
<td>1,767</td>
</tr>
<tr>
<td>Total amount of MW (kg)/ person:</td>
<td>327</td>
</tr>
<tr>
<td>Average income (GDP)/ capita in EUR:</td>
<td>13,200</td>
</tr>
</tbody>
</table>

List of 15 largest cities :
(Indicate city & population, rank in order of size)

1. Bratislava (462,603)
2. Košice (240,688)
3. Prešov (91,638)
4. Žilina (81,515)
5. Banská Bystrica (79,775)
6. Nitra (78,875)
7. Trnava (66,219)
8. Martin (57,300)
9. Trenčín (55,832)
10. Poprad (52,791)
11. Prievidza (48,866)
12. Zvolen (43,311)
13. Považská Bystrica (41,153)
14. Michalovce (39,940)
15. Nové Zámky (39,585)

1. Waste management practice

Collection schemes in place for MSW: 100 % waste collection coverage is ensured.

Separate collection of recyclables (paper, metal, plastic, glass): Pay-As-You-Throw (PAYT) scheme has been introduced, but not covering the whole country. Deposit refund systems [EC 2012]: return system for reusable beverage packaging in shops [EC 2012c]. The Waste Act establishes a deadline for the introduction of separate waste collection for waste paper, plastics, metals, and glass, but not for bio-waste (SK, SEA, 2012).

Separate collection of organic waste: Around 7 % of municipal waste is collected selectively. Existing recycling infrastructure is sufficient, but separate collection systems need to be improved further. Separate collection of bio-waste will be introduced by a new amendment of Waste Act in 2013 (SK, SEA, 2012).

Waste treatment (dominating practices per country: recycling, landfilling, incineration) in % and tons/year: According to the latest data, 75 % of MSW generated in Slovakia was still landfilled in 2011. Around 10 % of MSW in Slovakia is incinerated with energy recovery.

Treatment rates of municipal waste are shown in Table 1.1.
Table 1.1.: Treatment rates of municipal waste in Slovakia in 2010, as percentage of MSW generated

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material recycling</td>
<td>3.6</td>
</tr>
<tr>
<td>Composting</td>
<td>5.0</td>
</tr>
<tr>
<td>Incineration with energy recovery</td>
<td>9.5</td>
</tr>
<tr>
<td>Incineration without energy recovery</td>
<td>0.7</td>
</tr>
<tr>
<td>Landfilling</td>
<td>78.0</td>
</tr>
<tr>
<td>No information</td>
<td>3.2</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

Source: Eurostat 2012

The amount of generated MSW per capita has increased 18 % from 2002 to 2010.

Generation of MSW has increased from 1.5 million tonnes in 2002 to 1.8 million tonnes in 2010. Landfilling of municipal waste still prevails - around 80 % MSW is landfilled (EEA, 2010). Compared with other EU Member States that entered the EU in 2004-2007, Slovakia has a quite high percentage of incineration with energy recovery of MSW (10 %). There are two incineration plants for MSW, one in Bratislava and one in Kosice.

The amount of separately collected fractions of MSW increased from 3 % in 2002 to 7 % in 2009 (SOSR, 2012).

The problem of old and illegal dump sites still exists and has yet to be adequately addressed (BIPRO, 2012). There were an estimated 300 illegal dump sites in 2007 (BIPRO, 2012).

The total percentage of recycled MSW increasing from 3 % in 2001 to 9 % in 2010. In absolute terms recycling of MSW increased from 36 000 tonnes in 2001 to 156 000 tonnes in 2010.

The total increase of recycling is linked both to material and organic recycling, but the share of organic recycling is higher. Organic recycling has increased from 1 % (17 000 tonnes in absolute amount) in 2001 to 5 % (91 000 tonnes) in 2010.

Still, there is room for improving both material and organic recycling, but it seems that material recycling in particular can be improved.

Municipal waste treatment rates in 2011:
- Municipal waste landfilled: 78 %
- Municipal waste incinerated: 11 %
- Municipal waste recycled: 5 %
- Municipal waste composted: 6 %

2. Waste composition

Composition of municipal solid waste (MSW): In Slovakia, the largest fraction in municipal waste is presented by bio-waste, as shown in the figure below:\(^{137}\)

\(^{137}\) Waste and bio-waste management in Slovakia
3. Legal framework, standards and norms

Waste management plans (WMP) / waste prevention programmes (WPP) already adopted: 138

Title: Waste Management Plan of the Slovak Republic 2011-2015 (Program odpadového hospodárstva Slovenskej republiky na roky)
Adopted in (year): 2011
Website:

Recovery/recycling rates achieved so far per waste stream (at least paper, metal, plastic and glass): 139 The total recycling rate of MSW is still very low. According to present trends, an exceptional effort will be required to meet the EU requirement of 50 % MSW recycling in 2020

139 Note: Recycling/recovery targets to be achieved by 2020. 50% (by weight) preparing for re-use and recycling of waste materials such as at least paper, metal, plastic and glass from households and other origins similar to households (Waste Framework Directive 2008/98/EC).
### Waste streams

<table>
<thead>
<tr>
<th>Waste streams</th>
<th>Recovery rate, 2001 (%)</th>
<th>Recycling rate, 2011 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total packaging waste:</td>
<td>65</td>
<td>62.4</td>
</tr>
<tr>
<td>Paper and board packaging:</td>
<td>81.8</td>
<td>80.2</td>
</tr>
<tr>
<td>Metal packaging:</td>
<td>68.5</td>
<td>58.4</td>
</tr>
<tr>
<td>Plastic packaging:</td>
<td>53.7</td>
<td>49.9</td>
</tr>
<tr>
<td>Glass packaging:</td>
<td>63.9</td>
<td>63.9</td>
</tr>
</tbody>
</table>

Source: Eurostat, 2011

### Reduction targets for biodegradable municipal waste (BMW) achieved (2006, 2009, later):

In 2007 (no data for 2006 is available) the landfilled amount of BMW was 480,829 tonnes i.e. 69% of the quantity generated in 1995, whereas the target of the Landfill Directive for Slovakia for 2010 (with derogation) was 75%. But compared to 2007, the estimated amount of landfilled BMW in 2010 increased to 507,253 tonnes i.e. 73% of the quantity generated in 1995. Although the amount of landfilled BMW was higher than in 2007, the target value for 2010 is likely to have been successfully achieved.

Note: Article 5(2) of the Landfill Directive 99/31/EC requires the reduction of biodegradable municipal waste going to landfills to:
- 75% by 16 July 2006
- 50% by 16 July 2009 and
- 35% by 16 July 2016

calculated on the basis of the total amount of biodegradable municipal waste produced in 1995 or the latest year before 1995 for which standardised Eurostat data is available. Member States that landfilled more than 80% of their municipal waste in 1995 may postpone each of the targets by a maximum of four years.

141 Municipal waste management in Slovakia, ETC/SCP, February 2013
National strategy for the reduction of biodegradable waste going to landfills (due 16 July 2003):

Adopted in (year): 2006
Website: http://www.enviro.gov.sk/servlets/page/868?c_id=5605 (Slovak)

The strategy for biodegradable municipal waste is included in Waste Management Programme of SR for the years 2006 - 2010. 142

The following targets for biodegradable municipal waste are defined in Waste Management Programme of SR for the years 2006 - 2010:
- by the year 2010 achieve 50% rate of material recovery from biodegradable municipal waste.
- by the year 2010 decrease quantity of landflling biodegradable municipal waste by 20% compared to 2005.

National bodies responsible for MSW management:
- Ministry of Environment (MoE) – Department of Waste Management: preparation and implementation of waste legislation.
- Regional Environmental Offices – prepare Waste Management Plans for regions, second-level authorisation.
- District Environmental Offices - issue permits to waste management operations and activities, approve Waste Management Plans of municipalities and waste producers, control activities Slovak Environment Inspectorate (and some other institutions): inspection on waste legislation.
- Local municipalities - responsible for MSW management in their administrative territories
- Slovak Environmental Agency - expert organisation of the MoE, support to MoE by data analysis and preparation of Waste Management Plans.

---

142 Eionet, Country factsheet for Slovakia
25. Slovenia (SI)

General information

<table>
<thead>
<tr>
<th>Population (in millions):</th>
<th>2.1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total amount of MW (kt)/ year:</td>
<td>844</td>
</tr>
<tr>
<td>Total amount of MW (kg)/ person:</td>
<td>411</td>
</tr>
<tr>
<td>Average income (GDP)/ capita in EUR:</td>
<td>17,200</td>
</tr>
</tbody>
</table>

List of 15 largest cities:
(Indicate city & population, rank in order of size)

1. Ljubljana (274,826)
2. Maribor (94,809)
3. Celje (50,039)
4. Kranj (37,129)
5. Velenje (25,456)
6. Koper/Capodistria (24,996)
7. Novo Mesto (23,341)
8. Ptuj (18,164)
9. Trbovlje (18,164)
10. Kamnik (13,608)

1. Waste management practice

Collection schemes in place for MSW: Producer responsibility schemes are in place for collection of individual types of waste, along with companies that ensure the proper management of such waste. There is a system in place for separate collection for paper, metal, plastic and glass.

Separate collection of recyclables (paper, metal, plastic, glass): Slovenia already has such a system in place, but the results of separate collection are still far from those desired. Pay-as-you-throw (PAYT) scheme is in place. The maximum frequency of collection is once every 2 weeks. The municipality also provides: a food waste collection twice a week in small buckets; a weekly collection of plastic and cans in 60 l sacks; and a fortnightly collection of paper and card in a 140 l bin. There is a dense network of ‘bring sites’ for the collection of glass containers. 143

The packaging waste (paper, glass, plastic, metal, wood) is collected under the Green Dot scheme SLOPAK.

Separate collection of organic waste: Slovenia already has such a system in place, but the results of separate collection are still far from those desired.

Waste treatment (dominating practices per country: recycling, landfilling, incineration) in % and tons/year: The majority of MSW generated in Slovenia is still landfilled. According to the Slovenian Environment Agency 71 % of the municipal waste generated in 2008 was landfilled and 29 % recycled (360 000 tonnes) (SEA, 2010). However, according to Eurostat data, 37 % was recycled.

According to CEWEP (2010) some 20.000 tonnes of waste had been incinerated in Slovenia in 2008. With respect to waste treatment of MSW the market share of incineration is only 1 %.

143 BIO IS (2012)
With regard to municipal waste management, disposal still prevails. In 2008, 71% (800 thousand tonnes) of waste were deposited. Compared to 2002, it is an increase of 30% in municipal waste disposal. In 2008, 29% of municipal waste (360 thousand tonnes) were recycled, which actually is by 44-times more than in 2002, but the share of recycling remains too small in comparison to waste disposal.  

Municipal waste treatment rates in 2011:
- Municipal waste landfilled: 58 %
- Municipal waste incinerated: 2 %
- Municipal waste recycled: 34 %
- Municipal waste composted: 6 %

2. Waste composition

Composition of municipal solid waste (MSW):

Table 2.1 Structure of recycled MSW in Slovenia (Slovenia, 2012)

<table>
<thead>
<tr>
<th>Municipal waste fractions sent to recycling in 2010</th>
<th>Quantity in 1000 tonnes</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paper and Cardboard</td>
<td>121</td>
<td>38 %</td>
</tr>
<tr>
<td>Plastics</td>
<td>33</td>
<td>10 %</td>
</tr>
<tr>
<td>Glass</td>
<td>30</td>
<td>9 %</td>
</tr>
<tr>
<td>Metals</td>
<td>15</td>
<td>5 %</td>
</tr>
<tr>
<td>Wood</td>
<td>2</td>
<td>0 %</td>
</tr>
<tr>
<td>Textiles</td>
<td>1</td>
<td>0 %</td>
</tr>
<tr>
<td>Food waste</td>
<td>79</td>
<td>25 %</td>
</tr>
<tr>
<td>Garden waste</td>
<td>0</td>
<td>0 %</td>
</tr>
<tr>
<td>Inerts (e.g. C&amp;D)</td>
<td>20</td>
<td>6 %</td>
</tr>
<tr>
<td>WEEE</td>
<td>7</td>
<td>2 %</td>
</tr>
<tr>
<td>Batteries</td>
<td>0</td>
<td>0 %</td>
</tr>
<tr>
<td>Other hazardous waste</td>
<td>0</td>
<td>0 %</td>
</tr>
<tr>
<td>Others (e.g. bulky waste…)</td>
<td>10</td>
<td>3 %</td>
</tr>
<tr>
<td>Total recycled</td>
<td>317</td>
<td>100 %</td>
</tr>
</tbody>
</table>

Source: Slovenia, 2012. Note: According to the regional data 20,000 tonnes were composted in 2009, and according to Eurostat data for 2010, it was 20,000 tonnes in 2010, which indicates some discrepancy with the figure for food waste in the table.

144 Slovenian Environment Agency

144 Slovenian Environment Agency
3. Legal framework, standards and norms

Waste management plans (WMP) / waste prevention programmes (WPP) already adopted: 145
The first National Waste Management Plan is in the drafting process.

Recovery/recycling rates achieved so far per waste stream (at least paper, metal, plastic and glass): 146

<table>
<thead>
<tr>
<th>Waste streams</th>
<th>Recovery rate, 2001 (%)</th>
<th>Recycling rate, 2011 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total packaging waste:</td>
<td>70.5</td>
<td>63.6</td>
</tr>
<tr>
<td>Paper and board packaging:</td>
<td>77</td>
<td>73.5</td>
</tr>
<tr>
<td>Metal packaging:</td>
<td>40.4</td>
<td>40.4</td>
</tr>
<tr>
<td>Plastic packaging:</td>
<td>81.9</td>
<td>75.5</td>
</tr>
<tr>
<td>Glass packaging:</td>
<td>82.3</td>
<td>82.3</td>
</tr>
</tbody>
</table>

Source: Eurostat, 2011

Reduction targets for biodegradable municipal waste (BMW) achieved (2006, 2009, later): 147
In 2006, the landfilled amount of BMW was 312 000 tonnes, or 70 % of the quantity generated in 1995 (Figure 3.1). Therefore, the target value for 2006 was successfully reached. In 2009, 232 000 tonnes of BMW was landfilled, i.e. 52 % of the quantity generated in 1995, which means that the target for 2009 (50 %) was not fully reached. Furthermore, in 2010 the amount of landfilled BMW increased to 252 000 tonnes, i.e. 57 % of the quantity generated in 1995 (Slovenia, 2012).

146 Note: Recycling/recovery targets to be achieved by 2020: 50% (by weight) preparing for re-use and recycling of waste materials such as at least paper, metal, plastic and glass from households and other origins similar to households (Waste Framework Directive 2008/98/EC).
147 Note: Article 5(2) of the Landfill Directive 99/31/EC requires the reduction of biodegradable municipal waste going to landfills to:
- 75% by 16 July 2006
- 50% by 16 July 2009 and
- 35% by 16 July 2016

calculated on the basis of the total amount of biodegradable municipal produced in 1995 or the latest year before 1995 for which standardised Eurostat data is available. Member States that landfilled more than 80 % of their municipal waste in 1995 may postpone each of the targets by a maximum of four years.
**National strategy for the reduction of biodegradable waste going to landfills** (due 16 July 2003):

Title: Operational programme of waste disposal with the aim of reducing quantities of biodegradable waste, since 2008 (Operativni Program Odstranjevanja Odpadkov s ciljem Zmanjšanja Količin Odloženih Biorazgradljivih Odpadkov)
Adopted in (year): 2008

**National bodies responsible for MSW management:**
- Environmental Agency
- Ministry of Agriculture and Environment
- Municipalities - responsible for MSW management in their administrative territories
26. Spain (ES)

**General information**

<table>
<thead>
<tr>
<th>Population (in millions):</th>
<th>46.7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total amount of MW (kt)/ year:</td>
<td>22,997</td>
</tr>
<tr>
<td>Total amount of MW (kg)/ person:</td>
<td>531</td>
</tr>
<tr>
<td>Average income (GDP)/ capita in EUR:</td>
<td>22,300</td>
</tr>
<tr>
<td>List of 15 largest cities: (Indicate city &amp; population, rank in order of size)</td>
<td></td>
</tr>
<tr>
<td>1. Madrid (3,233,527)</td>
<td></td>
</tr>
<tr>
<td>2. Barcelona (1,620,943)</td>
<td></td>
</tr>
<tr>
<td>3. Valencia (797,028)</td>
<td></td>
</tr>
<tr>
<td>4. Seville (702,355)</td>
<td></td>
</tr>
<tr>
<td>5. Zaragoza (679,624)</td>
<td></td>
</tr>
<tr>
<td>6. Málaga (567,433)</td>
<td></td>
</tr>
<tr>
<td>7. Murcia (441,354)</td>
<td></td>
</tr>
<tr>
<td>8. Palma (407,648)</td>
<td></td>
</tr>
<tr>
<td>9. Las Palmas (382,296)</td>
<td></td>
</tr>
<tr>
<td>10. Bilbao (351,629)</td>
<td></td>
</tr>
<tr>
<td>11. Alicante (334,678)</td>
<td></td>
</tr>
<tr>
<td>12. Córdoba (328,841)</td>
<td></td>
</tr>
<tr>
<td>13. Valladolid (311,501)</td>
<td></td>
</tr>
<tr>
<td>14. Vigo (297,733)</td>
<td></td>
</tr>
<tr>
<td>15. Gijón (277,554)</td>
<td></td>
</tr>
</tbody>
</table>

1. **Waste management practice**

**Collection schemes in place for MSW**: In Spain, MSW is collected using a number of different systems. The results of a survey covering all Spanish towns and cities with over 50,000 inhabitants were used to define the three systems shown in Table 5 as being the most widely used on a national scale. They can be distinguished by the fractions that are sorted by the householder (rest waste, glass, paper/cardboard, packaging and/or organic) and the distance to the collection point (street-side containers or materials banks at high-density [close-to-home drop-off]) (Gallardo et al., 2008).

**Separate collection of recyclables (paper, metal, plastic, glass)**: Selective collection of materials was enforced at local levels, and national recovery and overall recycling objectives were set (Barlaz et al., 2002; Justice and Environment, 2011).

Only a few municipalities have Pay-as-You-Throw (PAYT) schemes. The proportion of households in Spain concerned by PAYT schemes is negligible. However, around 13% of households participate in selective waste collection.

**Catalonia region**: Although only very few municipalities have introduced PAYT schemes, all Catalan municipalities have implemented separate collection for glass, paper and packaging.

The few PAYT experiences have been implemented in municipalities with Door to Door collection schemes, achieving significant levels of separate collection (>75-85%).

All the schemes currently implemented are sack-based schemes.
Separate collection of organic waste: The National Waste Law (10/1998) which came into force in 1998 introduces the separate collection of MSW in all municipalities in Spain having more than 5,000 inhabitants and most importantly it is banning the disposal of recyclable materials (ETC/SCP, 2006). 148

710 Catalan municipalities (from overall 946) have already implemented the separate collection of bio-waste.

16 municipalities use carry out separation into 5 fractions (mixed waste, organic waste, paper-cardboard, glass and lightweight packaging). Mixed waste and bio-waste is collected at kerbside, while paper-cardboard, glass and lightweight packaging are collected at drop-off points. 149

Waste treatment (dominating practices per country: recycling, landfilling, incineration) in % and tons/year: Spain has taken measures, initiated by the waste management plans, to reduce its dependency on landfills and has created a viable market in waste management, succeeding in diverting significant amounts of waste from landfill. Landfilling was steadily below 60 % of the generated MSW throughout the last decade. Since 2006, the absolute amounts of MSW have been decreasing, the figure was around 24.5 million tonnes in 2010 (9 % was incinerated). Recycling amounted to 33 % in the same year, following a peak of nearly 40 % in 2008.

Municipal waste treatment rates in 2011:
- Municipal waste landfilled: 58 %
- Municipal waste incinerated: 9 %
- Municipal waste recycled: 15 %
- Municipal waste composted: 18 %

In Spain, around 5 % to 25 % of the local population is directly connected to a MBT plant and therefore considerable amounts of MSW are treated in MBT plants, (up to 1 million tonnes of MSW per year). The waste stream that is mechanically sorted prior to biological treatment is usually split into recyclable fractions (this also applies in aerobic digestion systems), while energy recovery is of relatively little importance (Steiner, 2007).

Catalonia region (2012): 150
- Municipal waste landfilled: 38,8 %
- Municipal waste incinerated: 11,5 %
- Mechanical-biological treatment: 49,7 %

2. Waste composition

Composition of municipal solid waste (MSW):
Composition of MSW in Castellón de la Plana area: 151
- Organic material 57%
- Paper/cardboard 15%
- Plastic 10%
- Glass 7%

---

148 Municipal Waste Management in Spain, ETC/SCP, February 2013
149 Separate Collection Systems for Urban Waste (UW)
150 Catalan programme 2013-2020
151 Case study: Spain
3. Legal framework, standards and norms

Waste management plans (WMP) / waste prevention programmes (WPP) already adopted: 152

Adopted in (year): 2007
Website: http://www.icog.es/files/PNIR3.pdf (In Spanish)

In December 2008, the second National Solid Waste Management Plan 2008-2015 updated and reintroduced some of the concepts of the previous plan and set ambitious targets for the 7-year period. Specifically it set the three ‘R’s (reduce, re-use, recycle) framework as the main driver of Spanish waste management and set out the guidelines and the main measures to be implemented, which are developed in thirteen specific plans for each type of waste (CIRIEC, 2010).

Apart from the national plans, regional plans are equally important in the management of MSW in Spain. Already in 2001, Catalonia had introduced its own Waste Management Plan, the Catalan Municipal Waste Management Programme (PROGREMIC). It was more far-reaching than plans from other regions and set a good example for the other regions of Spain to follow (ETC/SCP, 2006).

Title: Catalan programme 2013-20
Adopted in (year): February, 2014 (under public consultation)
Website: presentation

The government of Spain’s Catalonia region aims to reduce waste generation by 15% and to eliminate landfilling and incineration of unsorted waste by 2020 under a €782m programme launched in February 2014. Taxes on landfilling and incineration by municipalities must be raised significantly to improve sorting and recycling. The government proposes to sort 60% of waste at source and to reduce consumption of single-use plastic bags by 90% by 2020. The programme also aims for 75% recovery of packaging waste and to cut waste sector greenhouse gas emissions by 30% from 1.5 million tonnes per year at present.

Recovery/recycling rates achieved so far per waste stream (at least paper, metal, plastic and glass): 153

<table>
<thead>
<tr>
<th>Waste streams</th>
<th>Recovery rate, 2001 (%)</th>
<th>Recycling rate, 2011 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total packaging waste:</td>
<td>72.1</td>
<td>64.4</td>
</tr>
<tr>
<td>Paper and board packaging:</td>
<td>82.2</td>
<td>76.6</td>
</tr>
<tr>
<td>Metal packaging:</td>
<td>75.2</td>
<td>75.2</td>
</tr>
<tr>
<td>Plastic packaging:</td>
<td>55.5</td>
<td>32.4</td>
</tr>
<tr>
<td>Glass packaging:</td>
<td>66.6</td>
<td>66.6</td>
</tr>
</tbody>
</table>

Source: Eurostat, 2011

153 Note: Recycling/recovery targets to be achieved by 2020: 50% (by weight) preparing for re-use and recycling of waste materials such as at least paper, metal, plastic and glass from households and other origins similar to households (Waste Framework Directive 2008/98/EC).
Reduction targets for biodegradable municipal waste (BMW) achieved (2006, 2009, later): According to the EU Landfill Directive Member States have to reduce the amount of biodegradable municipal waste landfilled (BMW) with a certain percentage by 2006, 2009 and 2016. The targets are related to generated amount of BMW in 1995, in which Spain generated 11,934,142 tonnes of BMW.

Spain has reported the landfilled amount of BMW to the European Commission for the years 2007, 2008 and 2009 (EC, 2012). Figure 3.1 shows that in 2006 Spain had already reached the target of the Landfill directive for 2006 and in 2009 reached the respective target for 2009, with 47% of BMW going to landfill. Data for 2010 is missing, but when we estimate the amount of BMW going to landfill by subtracting the increase in amount of MSW going to organic recycling from 2009 to 2010 from the amounts of BMW being landfilled in 2009, there is no further reduction observed and more efforts are needed in Spain to achieve the 2016 target.

**Figure 3.1 Landfilling of biodegradable MSW in Spain**

Source: EC, 2012 and CRI calculation*. The figure for 2010 is estimated by CRI

---

**Note:** Article 5(2) of the Landfill Directive 99/31/EC requires the reduction of biodegradable municipal waste going to landfills to:

- 75% by 16 July 2006
- 50% by 16 July 2009
- 35% by 16 July 2016

calculated on the basis of the total amount of biodegradable municipal produced in 1995 or the latest year before 1995 for which standardised Eurostat data is available. Member States that landfilled more than 80% of their municipal waste in 1995 may postpone each of the targets by a maximum of four years.
National strategy for the reduction of biodegradable waste going to landfills (due 16 July 2003):
For the effective and timely implementation of the National Waste Law, the first National Solid Waste Management Plan 2000-2006 was drawn, which set targets for the waste management in Spain. It introduces the streamlining of treatment and disposal of MSW, trying to keep under control the MSW arising. Special attention is given to the valorisation of BMW, especially via composting (ETC/SCP, 2006).

From 2004, in some of the autonomous communities (regions) of Spain, a landfill tax was introduced in an effort to divert as much as possible waste from landfills but it is only in Catalonia where the tax applies to MSW (ETC/SCP, 2012). At the same time, additional investments in waste infrastructure and separate collection schemes reinforced the taxation schemes (ETC/SCP, 2006).

National bodies responsible for MSW management:
- The Ministry of Agriculture, Food and Environment - responsible for the national plans and attends to the authorization and inspection of waste shipments to/from third countries (outside EU).
- The municipal authorities - responsible for the management of the urban waste (domestic, industry and commerce, offices and services), including separate collection and transportation of MSW (CIRIEC, 2010).
- The autonomous regions - responsible for issuing strategic waste management plans for each specific region. They also attend to the authorization, inspection and sanction of waste management activities and the shipment of waste to/from EU countries.
27. Sweden (SE)

General information

<table>
<thead>
<tr>
<th>Population (in millions):</th>
<th>9.4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total amount of MW (kt)/ year:</td>
<td>4,350</td>
</tr>
<tr>
<td>Total amount of MW (kg)/ person:</td>
<td>460</td>
</tr>
<tr>
<td>Average income (GDP)/ capita in EUR:</td>
<td>41,196</td>
</tr>
</tbody>
</table>

**List of 15 largest cities:**

1. Stockholm (1,372,565)
2. Göteborg/Gothenburg (549,839)
3. Malmö (280,415)
4. Uppsalå (140,454)
5. Västerås (110,877)
6. Örebro (107,038)
7. Linköping (104,232)
8. Helsingborg (97,122)
9. Jönköping (89,396)
10. Norrköping (87,247)
11. Lund (82,800)
12. Umeå (79,594)
13. Gävle (71,033)
14. Borås (66,273)
15. Eskilstuna (64,679)

1. Waste management practice

**Collection schemes in place for MSW:**

**Separate collection of recyclables (paper, metal, plastic, glass):** Swedish MSW management is characterised by a clear division of responsibilities for all involved actors. Municipalities are obliged to have a waste management plan and bear the responsibility of collecting and disposing household waste, except for the product categories covered by producer responsibility. Municipalities may issue local regulations regarding the management of household waste, including fees (ETC/SCP, 2009). Households are responsible for separating and depositing waste at the various available collection points maintained by the municipalities. Households are also responsible for complying with municipal waste management regulations. Lastly, producers are obliged to take care of waste arising from their products (Avfall Sverige, 2011). In Sweden, producer responsibility for end-of-life packaging, cars, tyres, recycled paper, batteries and electrical and electronic products are in place (SEPA, 2005).

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 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 a separate bin combined with a bin for combustible waste. There are also multi-compartment bins and optical sorting systems. Optical sorting requires households to separate waste into different coloured bags that are placed in the same bin. The bags are transported by the waste collection vehicle to an optical sorting facility where they are separated automatically for appropriate treatment. The waste can be sorted into a large number of different fractions, including:
food waste, paper packaging, newspaper, metal packaging, plastic packaging, other household waste. A growing number of municipalities have introduced curbside collection of packaging and newspaper. Packaging and newspaper is commonly separated into two four-compartment bins which are collected at different intervals. One bin, which can be designated for e.g. food waste, combustible waste, paper packaging and coloured glass, is emptied every fortnight. The other bin, which is designated for e.g. clear glass, metal, plastic packaging and newspaper, is emptied every four or eight weeks.

Separate collection of organic waste:

Waste treatment (dominating practices per country: recycling, landfilling, incineration) in % and tons/year: The preferred waste management options in Sweden are incineration and recycling. MSW quantities have been almost equally diverted between these two waste treatment paths with a slight preference to incineration. Only in the years 2006 and 2007 was the share of recycling of MSW higher than the share of incineration due to an incineration tax imposed by the Swedish government in order to boost recycling, among other reasons. But soon after, incineration again increased its share. The tax was abolished in 2010. Sweden has been drastically reducing the amount of waste going to landfill from around 22 % of MSW in 2001 to 1 % in 2010, which translates to only 42 000 tonnes ending up in landfill in 2010 compared to 880 000 tonnes in 2001.

Municipal waste treatment rates in 2011:
- Municipal waste landfilled: 1 %
- Municipal waste incinerated: 51 %
- Municipal waste recycled: 33 %
- Municipal waste composted: 15 %

2. Waste composition

Composition of municipal solid waste (MSW): The following table shows the composition of material recycling as reported by various producer responsibility schemes for the years 2002-2010. Although the amounts of packaging are not presented below, their quantity has been included in the final calculation of the total material recycling. Statistics for packaging and paper recycling for 2010 will not be reported until 2012 because the method for reporting statistics is currently under review (Avfall Sverige, 2011). The total amount of biologically treated waste is also presented.

Table 2.1.: Composition of recycled municipal waste in Sweden between 2002 and 2010, in 1000 tonnes

<table>
<thead>
<tr>
<th>Recycling of MSW</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Newspapers</td>
<td>435</td>
<td>424</td>
<td>448</td>
<td>483</td>
<td>483</td>
<td>474</td>
<td>459</td>
<td>420</td>
<td>-</td>
</tr>
<tr>
<td>Office paper</td>
<td>123</td>
<td>129</td>
<td>132</td>
<td>135</td>
<td>153</td>
<td>164</td>
<td>156</td>
<td>118</td>
<td>132</td>
</tr>
<tr>
<td>Cardboard packages</td>
<td>346</td>
<td>361</td>
<td>375</td>
<td>380</td>
<td>487</td>
<td>504</td>
<td>482</td>
<td>480</td>
<td>-</td>
</tr>
<tr>
<td>Metal packages</td>
<td>33</td>
<td>32</td>
<td>34</td>
<td>34</td>
<td>35</td>
<td>33</td>
<td>33</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Plastic packages</td>
<td>24</td>
<td>26</td>
<td>31</td>
<td>42</td>
<td>49</td>
<td>50</td>
<td>44</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Glass packages</td>
<td>149</td>
<td>151</td>
<td>152</td>
<td>155</td>
<td>159</td>
<td>171</td>
<td>174</td>
<td>177</td>
<td>1658</td>
</tr>
<tr>
<td>WEEE</td>
<td>74</td>
<td>80</td>
<td>87</td>
<td>102</td>
<td>122</td>
<td>128</td>
<td>123</td>
<td>118</td>
<td>117</td>
</tr>
<tr>
<td>Refrigeration units</td>
<td>27</td>
<td>24</td>
<td>22</td>
<td>25</td>
<td>28</td>
<td>30</td>
<td>29</td>
<td>26</td>
<td>28</td>
</tr>
<tr>
<td>Metals from household waste</td>
<td>84</td>
<td>96</td>
<td>910</td>
<td>110</td>
<td>130</td>
<td>150</td>
<td>180</td>
<td>152</td>
<td>170</td>
</tr>
<tr>
<td>Total material recycling</td>
<td>1295</td>
<td>1314</td>
<td>1385</td>
<td>1474</td>
<td>1658</td>
<td>1738</td>
<td>1658</td>
<td>1587</td>
<td>1559</td>
</tr>
<tr>
<td>Total household waste</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>treated biologically</td>
<td>354</td>
<td>403</td>
<td>434</td>
<td>454</td>
<td>469</td>
<td>561</td>
<td>597</td>
<td>618</td>
<td>587*</td>
</tr>
</tbody>
</table>
3. Legal framework, standards and norms

Waste management plans (WMP) / waste prevention programmes (WPP) already adopted: 155

Title: National Waste Management Plan 2012 – 2017 (REMISSUTGÅVA 2011-09-12 - Från avfallshantering till resurshushållning)
Adopted in (year): 2012
Website: http://www.naturvardsverket.se/upload/20110912/remissplan-110912.pdf

In 2010, MSW recycling had already reached the level of 49.2%. However, the recycling level has only increased by a mere 1% in the recent 5 year period (2006-2010), and therefore some additional effort will be required to surpass this level and reach the 50% recycling target for 2020 as required in the EU Waste Framework Directive.

In the new Swedish waste management plan ‘Från avfallshantering till resurshushållning – Sveriges avfallsplan 2012–2017’ measures are included for promoting further material recycling. Targets include many initiatives and practices but these are mostly qualitative and advisory in nature. In order to increase recycling in MSW, ‘the recycling of household waste shall increase by making it easier for households to sort out and submit materials for recycling or preparation for reuse’ and ‘[…] at least 90 percent of households shall be satisfied with the collection’ of recyclables. Furthermore, the plan sets specific goals for food waste, promoting the management of food waste into a priority area to be considered in the future. Specifically ‘by 2018, 50 percent of food waste from households, institutional kitchens, shops and restaurants shall be sorted out and treated biologically and at least 40 percent shall be treated, so that energy will be taken advantage of’ (SEPA, 2012).

Waste Agenda

2013
By 12 December 2013, EU member states shall have established national waste prevention programmes 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 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 landfilled in accordance with authorisation given by the Environmental Code, or with regulations laid down in this code, shall 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, the EU member states shall have established, as a minimum, separate collection of paper, metal, plastic and glass provided that it is practicable from a technological, environmental and financial point of view. The requirements are laid down in the Waste Framework Directive.

2018

The objective for greater resource economisation in the food chain means that measures must be implemented by 2018 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 is separated and treated biologically to recover plant nutrients, and by at least 40 percent being treated to recover energy.

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 Framework Directive means new recycling goals for the member states. By 2020, 50 percent of the total amount of paper, metal, plastic and glass in household waste and equivalent waste shall be reused or recycled. For construction and demolition waste the figure is 70 percent.

Recovery/recycling rates achieved so far per waste stream (at least paper, metal, plastic and glass): 156

<table>
<thead>
<tr>
<th>Waste streams</th>
<th>Recovery rate, 2001 (%)</th>
<th>Recycling rate, 2011 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total packaging waste:</td>
<td>80.3</td>
<td>57</td>
</tr>
<tr>
<td>Paper and board packaging:</td>
<td>75.5</td>
<td>75.5</td>
</tr>
<tr>
<td>Metal packaging:</td>
<td>75.4</td>
<td>75.4</td>
</tr>
<tr>
<td>Plastic packaging:</td>
<td>58.2</td>
<td>34.1</td>
</tr>
<tr>
<td>Glass packaging:</td>
<td>91.9</td>
<td>91.9</td>
</tr>
</tbody>
</table>

Source: Eurostat, 2011

Sweden has reported the landfilled amount of BMW to the Commission for the years 2007, 2008 and 2009 (EC, 2012). According to these data the landfilling of BMW is steadily decreasing and in 2009 only 2 % (related to the generated amount of BMW in 1995) was going to landfill. Sweden has already reached all diversion targets of the Landfill Directive and no further effort is required.

National strategy for the reduction of biodegradable waste going to landfills (due 16 July 2003): The Swedish Parliament has established 16 environmental quality objectives, such as “Clean air” and “Good-quality groundwater”, to guide Sweden towards a sustainable society. The 16 environmental objectives will function as benchmarks for all environment-related development in Sweden, regardless of where it is implemented and by whom. The overriding aim is to solve all the major environmental problems within one generation.

156 Note: Recycling/recovery targets to be achieved by 2020: 50% (by weight) preparing for re-use and recycling of waste materials such as at least paper, metal, plastic and glass from households and other origins similar to households (Waste Framework Directive 2008/98/EC).

157 Note: Article 5(2) of the Landfill Directive 99/31/EC requires the reduction of biodegradable municipal waste going to landfills to:
– 75% by 16 July 2006
– 50% by 16 July 2009 and
– 35% by 16 July 2016

calculated on the basis of the total amount of biodegradable municipal produced in 1995 or the latest year before 1995 for which standardised Eurostat data is available. Member States that landfilled more than 80 % of their municipal waste in 1995 may postpone each of the targets by a maximum of four years.
National bodies responsible for MSW management:
- Avfall Sverige is the Swedish Waste Management and Recycling association with 400 members from both the public and the private waste management and recycling sectors. 99.9 per cent of the Swedish population are represented through Avfall Sverige. Avfall Sverige represents its members in dealings with politicians, other decision makers, authorities and media, both in Sweden and internationally.

- Avfall Sverige’s members makes sure that waste is collected and recycled in all municipalities nationally. In accordance with our vision “Zero Waste”, the Swedish municipalities and public companies are the facilitators for the transition towards waste minimization and reuse.

- Avfall Sverige – Swedish Waste Management, was founded in 1947. It is a stakeholder and trade association in the field of waste management and recycling.
Switzerland (CH)

General information

<table>
<thead>
<tr>
<th>Population (in millions):</th>
<th>8.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total amount of MW (kt)/ year:</td>
<td>5,478</td>
</tr>
<tr>
<td>Total amount of MW (kg)/ person:</td>
<td>689</td>
</tr>
<tr>
<td>Average income (GDP)/ capita in EUR:</td>
<td>61,900</td>
</tr>
</tbody>
</table>

List of 15 largest cities:
(Indicate city & population, rank in order of size)

1. Zürich (383,708)
2. Geneva (194,458)
3. Basel (173,330)
4. Lausanne (130,421)
5. Bern (127,515)
6. Lucerne (79,478)
7. Winterthur (105,461)
8. St. Gallen (74,101)
9. Lugano (61,837)
10. Biel/Bienne (52,351)
11. Thun (42,735)
12. Köniz (39,375)
13. La Chaux-de-Fonds (38,267)
14. Schaffhausen (35,413)
15. Fribourg (36,633)

1. Waste management practice

Collection schemes in place for MSW:

Separate collection of recyclables (paper, metal, plastic, glass): Separate collection on MSW has been improving continuously and especially separate collection of waste paper and cardboard has improved further between 2001 and 2010 (BAFU, 2011) which is also supported by a framework agreement for the financing of the collection of used paper (ETC/SCP, 2009) by setting a purchase guarantee and minimum price for the used paper collected by municipalities.

Separate collection of organic waste: Different technical ordinances on waste (including the one on organic waste from 1990, and on combustible waste from 2000) are the reference regulation for municipal waste (ETC/SCP, 2009). According to the reference regulation, recyclable fractions of municipal waste – also including biodegradable fractions like paper, and compostable waste – have to be collected separately and recovered. The landfilling of combustible waste is prohibited (also including biodegradable fractions).

Waste treatment (dominating practices per country: recycling, landfilling, incineration) in % and tons/year: Switzerland has a long tradition in diverting waste from landfill and has a long established good recycling system and performance. Most of the MSW generated in the country is either recycled or incinerated.

Municipal waste treatment rates in 2011:

- Municipal waste landfilled: 0 %
- Municipal waste incinerated: 50 %
- Municipal waste recycled: 35 %

---

158 Eurostat Commission - STAT/13/33, 4 March 2013
2. Waste composition

Composition of municipal solid waste (MSW):

Figure 2.1. Average composition of the unsorted MSW from 33 Swiss communities (2002)

It appears that 27% of the unsorted municipal waste is biologically treatable, not including paper and cardboard.

3. Legal framework, standards and norms

Waste management plans (WMP) / waste prevention programmes (WPP) already adopted: 159

There are no national waste plans on the federal level. Cantons have to draw up their own management plans, and review it periodically. A Technical Ordinance on Waste defines the content of waste management plans and Cantons have to submit the plan to BAFU, for conformity assessment.160

---

160 BAFU (Swiss Federal Office for the Environment)
Recovery/recycling rates achieved so far per waste stream (at least paper, metal, plastic and glass): The total recycling accounted for 50 %, out of which 33 % was material recycling (including metal, glass, plastic, paper and cardboard, but excluding composting), while composting and other biological treatment together accounted for 15 % between the years 2001 and 2010.

The country has already had a recycling performance of 50 % in 2005 which obviously already met the 50 % target set for 2020 by the EU legislation. This is despite the fact that Switzerland was not obliged to meet this target as the country is neither a member of the European Union nor the European Economic Area.

Reduction targets for biodegradable municipal waste (BMW) achieved (2006, 2009, later): Although the EU waste targets are not binding for Switzerland, the country currently has a recycling performance that meets and slightly exceeds the EU Waste Framework Directive’s 2020 target to recycle 50 % of MSW.

National strategy for the reduction of biodegradable waste going to landfills (due 16 July 2003): In 2000, Switzerland introduced a ban on the landfilling of combustible waste, and took steps to ensure that incineration capacity was expanded. The landfilling of biodegradable municipal waste is practically zero, which would rank Switzerland amongst the best performing EU Member States. A level of zero BMW landfilling has been achieved by the combination of incineration and recycling.

National bodies responsible for MSW management: BAFU (Swiss Federal Office for the Environment)

---

Note: Recycling/recovery targets to be achieved by 2020: 50% (by weight) preparing for re-use and recycling of waste materials such as at least paper, metal, plastic and glass from households and other origins similar to households (Waste Framework Directive 2008/98/EC).

Note: Article 5(2) of the Landfill Directive 99/31/EC requires the reduction of biodegradable municipal waste going to landfills to:
- 75% by 16 July 2006
- 50% by 16 July 2009 and
- 35% by 16 July 2016

calculated on the basis of the total amount of biodegradable municipal produced in 1995 or the latest year before 1995 for which standardised Eurostat data is available. Member States that landfilled more than 80 % of their municipal waste in 1995 may postpone each of the targets by a maximum of four years.
29. Turkey (TR)

General information

<table>
<thead>
<tr>
<th>Population (in millions):</th>
<th>73.7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total amount of MW (kt)/ year:</td>
<td>29,300</td>
</tr>
<tr>
<td>Total amount of MW (kg)/ person:</td>
<td>395</td>
</tr>
<tr>
<td>Average income (GDP)/ capita in EUR:</td>
<td>7,500</td>
</tr>
</tbody>
</table>

List of 15 largest cities:
(Indicate city & population, rank in order of size)
1. İstanbul (13,710,512)
2. Ankara (4,630,735)
3. İzmir (3,401,994)
4. Bursa (1,983,880)
5. Adana (1,636,220)
6. Gaziantep (1,438,373)
7. Konya (1,107,886)
8. Antalya (1,073,794)
9. Kayseri (1,008,889)
10. Diyarbakır (892,713)
11. Mersin (876,956)
12. Eskişehir (659,924)
13. İzmir (559,954)
14. Şanlıurfa (526,247)
15. Denizli (565,497)

1. Waste management practice

Collection schemes in place for MSW: The amount of collected MSW in 2010 was 25 million tons, equivalent to 84 % of the total generated MSW.

Separate collection of recyclables (paper, metal, plastic, glass): According to the first regulation on packaging waste control (2004, "By-Law on Control of Packaging Waste", revised in 2011) the packaging waste should be collected separately at its source, then sorted and transported within a certain system. 15 192 economic operators registered to the system in 2012. 163

Separate collection of organic waste: Collection and disposal of biodegradable municipal are executed by municipalities.

Waste treatment (dominating practices per country: recycling, landfilling, incineration) in % and tons/year: The great majority of solid waste is still not being disposed in accordance with the legislation.

No MSW is material recycled (Eurostat data). However, the Turkish Ministry of Environment and Urbanization reports the total amount of recycled packaging waste in 2009 to be 2.5 million tonnes, and certainly part of this recycled packaging waste is from MSW sources, but the share is unknown.

Municipal waste treatment rates in 2001:
- Municipal waste landfilled: 99 %
- Municipal waste incinerated: 0 %
- Municipal waste recycled: 0 %
- Municipal waste composted: 1 %

163 Municipal Waste Management in Turkey, ETC/SCP, February 2013
2. Waste composition

Composition of municipal solid waste (MSW): \[164\]

The total amount of biodegradable waste (kitchen waste, garden waste, paper/cardboard) generated in Turkey is around 15 million tons/year.

Overview of the total waste streams in the country: \[165\]

- MSW and Industrial Waste 65.45%
- Ash 22.48%
- Recycling Material 12.05 %:
  - Paper-cardboards 45.48 %
  - Metals 8.62 %
  - Plastics 13.19 %
  - PET,PVC 6.15 %
  - Rubber 3.30 %
  - Textile 4.80 %

3. Legal framework, standards and norms

Waste management plans (WMP) / waste prevention programmes (WPP) already adopted: \[166, 167\]

Title: National Waste Management Plans 2009-2013
283 packaging waste management plans are approved by the MoEU (2011)
Website: http://www.cygm.gov.tr/CYGM/Files/EylemPlan/atikeylemlanli.pdf

---

\[164\] SOER 2010, EEA
\[165\] Turkish Statistical Institute, 1992
\[167\] Factsheet for Turkey, Eionet
Title: The ‘By-law on General Principles of Waste Management (05.07.2008 - 2697) set the framework of waste management, from waste generation to disposal so that the procedures are followed in an environmentally sound way.  
Adopted in (year): 2008  

Website: http://www.atikyonetimi.cevreorman.gov.tr/belge/atikeylemplani.pdf (in Turkish)

There are no Regional Waste Management Plans. Thus, National Action Plan on Waste Management suggests the application of “Union of Municipalities” model that proposes that the neighbouring small municipalities which face similar waste management problems collaborate on waste management.

Title: Solid Waste Master Plan  
Adopted in (year): 2006

**Recovery/recycling rates achieved so far per waste stream** (at least paper, metal, plastic and glass): 168 Legislative targets for recycling of packaging waste according to Turkish law responding to the EU Packaging Waste Directive. 169

<table>
<thead>
<tr>
<th>Years</th>
<th>Glass</th>
<th>Plastic</th>
<th>Metal</th>
<th>Paper/Cardboard</th>
<th>Wood</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>32</td>
<td>32</td>
<td>30</td>
<td>20</td>
<td>-</td>
</tr>
<tr>
<td>2006</td>
<td>33</td>
<td>35</td>
<td>33</td>
<td>30</td>
<td>-</td>
</tr>
<tr>
<td>2007</td>
<td>35</td>
<td>35</td>
<td>35</td>
<td>35</td>
<td>-</td>
</tr>
<tr>
<td>2008</td>
<td>35</td>
<td>35</td>
<td>35</td>
<td>35</td>
<td>-</td>
</tr>
<tr>
<td>2009</td>
<td>36</td>
<td>36</td>
<td>36</td>
<td>36</td>
<td>-</td>
</tr>
<tr>
<td>2010</td>
<td>37</td>
<td>37</td>
<td>37</td>
<td>37</td>
<td>-</td>
</tr>
<tr>
<td>2011</td>
<td>38</td>
<td>38</td>
<td>38</td>
<td>38</td>
<td>-</td>
</tr>
<tr>
<td>2012</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>-</td>
</tr>
<tr>
<td>2013</td>
<td>42</td>
<td>42</td>
<td>42</td>
<td>42</td>
<td>5</td>
</tr>
<tr>
<td>2014</td>
<td>44</td>
<td>44</td>
<td>44</td>
<td>44</td>
<td>5</td>
</tr>
<tr>
<td>2015</td>
<td>48</td>
<td>48</td>
<td>48</td>
<td>48</td>
<td>5</td>
</tr>
<tr>
<td>2016</td>
<td>52</td>
<td>52</td>
<td>52</td>
<td>52</td>
<td>7</td>
</tr>
<tr>
<td>2017</td>
<td>54</td>
<td>54</td>
<td>54</td>
<td>54</td>
<td>9</td>
</tr>
<tr>
<td>2018</td>
<td>56</td>
<td>56</td>
<td>56</td>
<td>56</td>
<td>11</td>
</tr>
<tr>
<td>2019</td>
<td>58</td>
<td>58</td>
<td>58</td>
<td>58</td>
<td>13</td>
</tr>
<tr>
<td>2020</td>
<td>60</td>
<td>60</td>
<td>60</td>
<td>60</td>
<td>15</td>
</tr>
</tbody>
</table>

168 Note: Recycling/recovery targets to be achieved by 2020: 50% (by weight) preparing for re-use and recycling of waste materials such as at least paper, metal, plastic and glass from households and other origins similar to households (Waste Framework Directive 2008/98/EC).

169 By-law on Control of Packaging Waste (24.08.2011), MoEU
Reduction targets for biodegradable municipal waste (BMW) achieved (2006, 2009, later): \(^{170}\) The By-law on Landfill of waste (No:27533 2012/03) aimed to decrease the amount of landfilled biodegradable municipal waste in a scheduled period. The preparation of a strategy to decrease the amount of biodegradable waste is on-going according to the Turkish Ministry of Environment and Urbanisation.

In order to decrease the amount of biodegradable waste sent to landfill sites, new MBTs are under construction. 8 composting facilities and 6 facilities for electricity production from methane gas are operating (MoEU 2012).

**National strategy for the reduction of biodegradable waste going to landfills** (due 16 July 2003):
Title: By-law on Landfill of waste (No: 27533 2012/03) – aims to decrease the amount of landfilled biodegradable municipal waste in a scheduled period. The preparation of a strategy to decrease the amount of biodegradable waste is on-going.\(^{171}\)
Adopted in (year): 2012

The National strategy on the reduction of biodegradable waste to be disposed of in landfill facilities has also been developed at a draft stage. This strategy shall include the measures to be taken with the methods such as recycling, composting, biogas production or energy/material recovery.

According to the strategy for the reduction of biodegradable waste amounts, the implementation of the EU Landfill Directive (99/31/EC) will be carried out by 2025 (MoEU, 2012).

**National bodies responsible for MSW management:**

*The Metropolitan Municipalities:*
- To implement the Solid Waste Management Plan.
- To make sure that solid wastes are collected at source, recycled, reused, or stored and removed accordingly; and to establish appropriate facilities, or to make sure that they are established by others, so that these services can be fulfilled.

*Municipalities:*
- sole responsible for the management of municipal waste
- to provide all services regarding collection, transportation, separation, recycling, disposal and storage of solid wastes; or to appoint others to provide these services
- Since 2003, municipalities are implementing municipal waste management projects by cooperating with other municipalities in the region (through the municipalities union)

\(^{170}\) **Note:** Article 5(2) of the Landfill Directive 99/31/EC requires the reduction of biodegradable municipal waste going to landfills to:
- 75% by 16 July 2006
- 50% by 16 July 2009 and
- 35% by 16 July 2016

calculated on the basis of the total amount of biodegradable municipal produced in 1995 or the latest year before 1995 for which standardised Eurostat data is available. Member States that landfilled more than 80 % of their municipal waste in 1995 may postpone each of the targets by a maximum of four years.

\(^{171}\) **Ministry of Environment and Urbanisation**, Turkey
Ministry of Environment and Urbanization (MoEU): gives licenses to collection, separation and recycling facilities.

The State Planning Organization:
- to prepare the sectorial plans and to approve projects in need of public financing and foreign credits.
- to be in charge of planning and programming waste.
- to manage investments and strategic solid waste projects.

İller Bank:
- to implement the projects on solid waste management.
- to provide the financing of those projects.
30. United Kingdom (UK)

General information

<table>
<thead>
<tr>
<th>Population (in millions):</th>
<th>64</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total amount of MW (kt)/ year:</td>
<td>31,000</td>
</tr>
<tr>
<td>Total amount of MW (kg)/ person:</td>
<td>423</td>
</tr>
<tr>
<td>Average income (GDP)/ capita in EUR:</td>
<td>Mean annual gross salary EUR 31,980</td>
</tr>
</tbody>
</table>

List of 15 largest cities:
(Indicate city & population, rank in order of size)
1. London (7.2 Million)
2. Birmingham (992 000)
3. Leeds (720 000)
4. Glasgow (560 000)
5. Sheffield (512 000)
6. Bradford (467 000)
7. Edinburgh (450 000)
8. Liverpool (440 000)
9. Manchester (420 000)
10. Bristol (380 000)
11. Wakefield (316 000)
12. Cardiff (310 000)
13. Coventry (305 000)
14. Nottingham (285 000)
15. Leicester (280 000)

1. Waste management practice

Collection schemes in place for MSW:

Separate collection of recyclables (paper, metal, plastic, glass): Kerbside collection, where the materials are sorted on the vehicle at the kerbside. Co-mingled where all the recyclables are collected in one container and sorted at waste facility, usually a Materials Recycling Facility (MRF).

Separate collection of organic waste: Organic waste is collected either as separate green (garden) waste; separate food waste or green and food collected together in the same container.

Waste treatment (dominating practices per country: recycling, landfilling, incineration) in % and tons/year: Household waste: Recycling: 43.2%; Local Authority Managed Waste for Incineration: 22% (5.5Million tonnes in 2012/13). Local Authority Managed Waste to landfill: 8.5M tonnes in 2012/13 (34%).

In recent years, a combination of recycling and composting has become the largest means of managing wastes, accounting for 26.7% and 15.5%, respectively, of the total MSW generated. A total of 73% of the composted waste is treated in open air windrows. However, 40.3% is still sent to landfill while only 16% is combusted in 24 waste to energy facilities which recover 1594 GWh of electricity annually - this equates to some 0.41 MWh of electricity generated for every tonne of MSW combusted.

---

172 DEFRA, 2013
Recycling/reuse together with composting have become the dominant methods of waste management in the UK, accounting for 42.2% of the total MSW. In 2012, a total of 13.1 million tonnes of MSW was recycled or composted in the UK. The per capita recycling and composting for UK residents is 0.21 tonnes. England recycles and composes the least with 0.20 tonnes per capita (42% of the total MSW produced in England), followed by Northern Ireland (0.21; 39% of the total MSW produced in N. Ireland), Wales and Scotland (0.25 each; 50.1% and 42% of the total MSW produced in each country accordingly).

Municipal water treatment rates in 2011:
- Municipal waste landfilled: 49 %
- Municipal waste incinerated: 12 %
- Municipal waste recycled: 25 %
- Municipal waste composted: 14 %

2. Waste composition

Composition of municipal solid waste (MSW):

Northern Ireland - In 2012/13, compostable (excluding all wood) waste accounted for the largest proportion of municipal waste material collected for recycling at 43%, the same proportion as in 2011/12.

Scotland - the main components of MSW in Scotland are paper & card (21%) and food/kitchen waste (18%); which between them represent approximately 39% by weight of total MSW arisings. The third largest component is garden waste, which represents 13% by weight of the total MSW arisings in Scotland. The overall composition of MSW in Scotland is similar to both that determined in a study in Wales in 2002/03 and the composition determined by the Defra review of compositional analyses (mostly conducted in England) published in 2009. Thus the datasets used to determine the overall composition of MSW in Scotland are considered to be robust. The overall biodegradable content of municipal solid waste in Scotland is 62.9%. The 95% confidence intervals for the biodegradable content of MSW in Scotland were ±1.5%, which means that there is a 95% probability that the biodegradable content of MSW in Scotland is between 61.4% and 64.4%.

Wales - The study analysed a total of 240 tonnes of municipal waste. The information derived from this work on the composition of each waste stream, together with an analysis of the overall composition of MSW in Wales, will provide local authorities in Wales with sufficiently robust information to enable them to further develop their recycling and composting strategies.

The three main waste streams (based on WasteDataFlow data for 2008/9) that comprised MSW in Wales were:
- residual household collected (dustbin) waste – 42% of MSW arisings;
- residual waste arisings at household waste recycling centre (HWRC) sites – 8% of MSW arisings; and
- trade waste collected by local authorities – 7% of MSW arisings.

Other waste streams, which include litter and bulky household waste, represented about 5% by weight of MSW arisings in Wales. The remainder (37%) was recycled. ¹⁷³

¹⁷³ Defra, UK
3. Legal framework, standards and norms

Waste management plans (WMP) / waste prevention programmes (WPP) already adopted: 174

UK – England:
Title: Government Review of Waste Policy in England 2011
Adopted (in year): 2011
http://www.defra.gov.uk/statistics/environment/waste/

UK – Wales:
Adopted (in year): 2010; 2011

UK – Scotland:
Title: Household waste prevention action plan *
Adopted (in year): 2007

Title: Scotland’s Zero Waste Plan
Adopted (in year): 2010

UK – Northern Ireland:
Title: Framework for Waste Prevention in Northern Ireland
Adopted (in year): 2005
Website: http://www.doeni.gov.uk/niea/wasteprevention_2.pdf

Title: Towards Resource Management - The Northern Ireland Waste Management Strategy 2006 - 2020
Adopted (in year): 2006, revised in 2013
Website: http://www.doeni.gov.uk/towards_resource_management.pdf; The revised Northern Ireland Waste Management Strategy is entitled “Delivering Resource Efficiency”.

UK – Gibraltar:
Title: Gibraltar Waste Management Plan 2011-2013
Adopted (in year): 2011

Recovery/recycling rates achieved so far per waste stream (at least paper, metal, plastic and glass): 175

The UK has a statutory producer responsibility regime for packaging. This places a legal obligation on businesses which make or use packaging (like raw materials manufacturers, converters, packer/fillers and sellers) to ensure that a proportion of the packaging they place on the market is recovered and recycled.

UK packaging waste recovery and recycling targets for 2013 to 2017

On 21 March 2012, as part of the Budget, new packaging targets for 2013 to 2017 were announced. These reflected the preferred option based on responses received from a consultation.

The targets apply to businesses under the Producer Responsibility Regulations. They will ensure that the UK continues to meet EU Directive targets over the next 5 years.

Table 3.1.: UK packaging waste recovery and recycling targets for 2013 to 2017

<table>
<thead>
<tr>
<th>Material</th>
<th>2012 (%)</th>
<th>2013 (%)</th>
<th>2014 (%)</th>
<th>2015 (%)</th>
<th>2016 (%)</th>
<th>2017 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paper/card</td>
<td>69.5</td>
<td>69.5</td>
<td>69.5</td>
<td>69.5</td>
<td>69.5</td>
<td>69.5</td>
</tr>
<tr>
<td>Glass</td>
<td>81</td>
<td>81</td>
<td>81</td>
<td>81</td>
<td>81</td>
<td>81</td>
</tr>
<tr>
<td>Aluminium</td>
<td>40</td>
<td>43</td>
<td>46</td>
<td>49</td>
<td>52</td>
<td>55</td>
</tr>
<tr>
<td>Steel</td>
<td>71</td>
<td>72</td>
<td>73</td>
<td>74</td>
<td>75</td>
<td>76</td>
</tr>
<tr>
<td>Plastic</td>
<td>32</td>
<td>37</td>
<td>42</td>
<td>47</td>
<td>52</td>
<td>57</td>
</tr>
<tr>
<td>Wood</td>
<td>22</td>
<td>22</td>
<td>22</td>
<td>22</td>
<td>22</td>
<td>22</td>
</tr>
<tr>
<td>Total recovery</td>
<td>74</td>
<td>75</td>
<td>76</td>
<td>77</td>
<td>78</td>
<td>79</td>
</tr>
<tr>
<td>Of which recycling</td>
<td>68.1</td>
<td>69</td>
<td>69.9</td>
<td>70.8</td>
<td>71.8</td>
<td>72.7</td>
</tr>
</tbody>
</table>

As these targets only apply to obligated businesses, the overall level of recycling and recovery will be lower.

Table 3.2.: Recovery and recycling rates achieved per waste streams in 2011

<table>
<thead>
<tr>
<th>Waste streams</th>
<th>Recovery rate, 2001 (%)</th>
<th>Recycling rate, 2011 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total packaging waste:</td>
<td>67.1</td>
<td>60.8</td>
</tr>
<tr>
<td>Paper and board packaging:</td>
<td>95.6</td>
<td>84.8</td>
</tr>
<tr>
<td>Metal packaging:</td>
<td>55.3</td>
<td>55.3</td>
</tr>
<tr>
<td>Plastic packaging:</td>
<td>35.1</td>
<td>24.2</td>
</tr>
<tr>
<td>Glass packaging:</td>
<td>63.9</td>
<td>63.9</td>
</tr>
</tbody>
</table>

Source: Eurostat, 2011

175 Note: Recycling/recycling targets to be achieved by 2020: 50% (by weight) preparing for re-use and recycling of waste materials such as at least paper, metal, plastic and glass from households and other origins similar to households (Waste Framework Directive 2008/98/EC).
Reduction targets for biodegradable municipal waste (BMW) achieved (2006, 2009, later): The UK has been given a four year derogation period with respect to these targets. As such the UK targets are that landfilled quantities of BMW must be reduced to 75 % of 1995 BMW by 2010, 50 % by 2013 and 35 % by 2020.

BMW sent to landfill in the UK as reported in 2007 (23.3 million tonnes) was 63 % higher than the figure reported for 2006 (14.3 million tonnes). This is a result of changing definitions for BMW rather than increases in the amount of biodegradable waste being landfilled.

Following the change in definition of BMW, the UK adjusted the Landfill Directive diversion targets. The old and new targets are shown in Table 3.4.

Table 3.4: Landfill Directive diversion targets according to old and revised definitions of BMW

<table>
<thead>
<tr>
<th></th>
<th>1995 quantity of BMW</th>
<th>2010 Target (75% of 1995)</th>
<th>2013 Target (50% of 1995)</th>
<th>2020 Target (35% of 1995)</th>
</tr>
</thead>
<tbody>
<tr>
<td>UK Target for landfill of BMW under old definition (thousand tonnes)</td>
<td>18260</td>
<td>13695</td>
<td>9130</td>
<td>6391</td>
</tr>
<tr>
<td>UK Target for landfill of BMW following 2010 revision (thousand tonnes)</td>
<td>35688</td>
<td>26766</td>
<td>17844</td>
<td>12491</td>
</tr>
</tbody>
</table>

According to personal correspondence on 14 June 2012 with David Lee, Waste Statistics Team Defra

Note: Article 5(2) of the Landfill Directive 99/31/EC requires the reduction of biodegradable municipal waste going to landfills to:

- 75% by 16 July 2006
- 50% by 16 July 2009 and
- 35% by 16 July 2016

calculated on the basis of the total amount of biodegradable municipal produced in 1995 or the latest year before 1995 for which standardised Eurostat data is available. Member States that landfilled more than 80 % of their municipal waste in 1995 may postpone each of the targets by a maximum of four years.
Figure 3.1 shows that already by 2006 the UK was close to achieving the 2010 target for diversion of BMW from landfill having reduced landfilled BMW by 78%. By 2009, the 2013 target had been exceeded suggesting that the 4 year derogation negotiated by the UK had in fact not been necessary.

**National strategy for the reduction of biodegradable waste going to landfills** (due 16 July 2003):

Title: Landfill Allowance Trading Scheme (LATS) - the world’s first allowance trading scheme for municipal waste

Adopted in (year): 2005


The scheme aims to give local authorities flexibility in meeting tough Landfill Directive targets to reduce the amount of biodegradable municipal waste (BMW) going to landfill sites.  

The Government has given local authorities allowances for the amount of BMW they can landfill for every year of the scheme until 2020. The allowances have been allocated to constrain total amount of BMW landfilled in landfill directive target years, 2010, 2013 and 2020. Local authorities can trade allowances with each other, sell allowances if they have diverted more waste from landfill (e.g. recycling) or buy more if they are likely to exceed their own allocation. Local authorities can also bank unused allowances or borrow from their future allocations, depending on the scheme year. The advantages of the scheme that have been identified include:

- The costs of achieving compliance can be reduced overall

---

177 Municipal waste management in the United Kingdom, ETC/SCP, February 2013

178 Eionet, Factsheet for the UK, 2009
Local Authorities will have greater choice over how to meet their reduction targets in the way that best suits local needs.

A trading system will allow local authorities to choose whether to landfill any additional waste (by buying extra allowances from an authority that had reduced its reliance on landfill further than needed) or to invest in alternative means of disposal, thus allowing flexibility.

The monitoring authority (the Environment Agency for England and Wales) will reconcile the number of permits held by an authority for a given period with the volume of waste that authority has sent to landfill over the same period. If the enforcing body finds that the volume of waste landfilled exceeds the amounts for which permits are available, a financial penalty will be applied (£150 per tonne fine for every tonne of BMW that is landfilled over the level of allowances held).

The Northern Ireland Landfill Allowance Scheme (NILAS) was also introduced in April 2005. The Directive’s targets are achieved through the allocation to Councils who are liable to a fine of £150 per tonne of BMW that is landfilled over the allowance allocation. NILAS is implemented in similar terms to LAS in England, the only difference being that no money based trading of allowances is permitted. Instead allowances may be transferred free of charge between authorities.

National bodies responsible for MSW management:
Waste policy is a devolved matter in the UK. The devolved administrations of Scotland, Wales and Northern Ireland are responsible for strategy and policy relating to waste management in those regions.

- Central Government – responsible for national planning policies and waste management practices in terms of location and use of facilities.
- Waste planning authorities - responsible for ensuring that an adequate planning framework exists.
- Waste Collection Authorities (WCA) in England and Wales (376) - responsible for collecting waste from nearly 22 million homes and some businesses.
- Waste disposal authority (WDA) - manage the waste that is collected by the local councils.
- Local Authorities – responsible to set targets under “Best Value” arrangements; such targets must take account of the waste strategy. They also collect two recyclable fractions.
- Unitary authorities in Wales (22) each of them has the responsibility of producing a development plan, which identifies the designated land uses in its area.
- Regional Waste Groups (3) in Wales - each of which is responsible for producing a Regional Waste Plan in accordance with the Welsh Assembly Government’s Planning Policy Wales Technical Advice Note (TAN) 21: Waste.
- In Wales there is a single tier of 22 local authorities that are both Waste Collection and Waste Disposal authorities.
- DEFRA – the UK’s Ministerial Department for Environment, Food and Rural Affairs
- Environment Agency – environment regulator for England
- SEPA – Scottish Environment Protection Agency
- National Resources for Wales – environment regulator for Wales
- DOE NI – Northern Ireland environment regulator.
List of 30 countries

<table>
<thead>
<tr>
<th>No.</th>
<th>Country code</th>
<th>Country name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>BE</td>
<td>Belgium</td>
</tr>
<tr>
<td>2</td>
<td>BG</td>
<td>Bulgaria</td>
</tr>
<tr>
<td>3</td>
<td>HR</td>
<td>Croatia</td>
</tr>
<tr>
<td>4</td>
<td>CY</td>
<td>Cyprus</td>
</tr>
<tr>
<td>5</td>
<td>CZ</td>
<td>Czech Republic</td>
</tr>
<tr>
<td>6</td>
<td>DK</td>
<td>Denmark</td>
</tr>
<tr>
<td>7</td>
<td>EE</td>
<td>Estonia</td>
</tr>
<tr>
<td>8</td>
<td>FI</td>
<td>Finland</td>
</tr>
<tr>
<td>9</td>
<td>FR</td>
<td>France</td>
</tr>
<tr>
<td>10</td>
<td>DE</td>
<td>Germany</td>
</tr>
<tr>
<td>11</td>
<td>GR</td>
<td>Greece</td>
</tr>
<tr>
<td>12</td>
<td>HU</td>
<td>Hungary</td>
</tr>
<tr>
<td>13</td>
<td>IE</td>
<td>Ireland</td>
</tr>
<tr>
<td>14</td>
<td>IT</td>
<td>Italy</td>
</tr>
<tr>
<td>15</td>
<td>LV</td>
<td>Latvia</td>
</tr>
<tr>
<td>16</td>
<td>LT</td>
<td>Lithuania</td>
</tr>
<tr>
<td>17</td>
<td>ME</td>
<td>Montenegro</td>
</tr>
<tr>
<td>18</td>
<td>NL</td>
<td>Netherlands</td>
</tr>
<tr>
<td>19</td>
<td>NO</td>
<td>Norway</td>
</tr>
<tr>
<td>20</td>
<td>PL</td>
<td>Poland</td>
</tr>
<tr>
<td>21</td>
<td>PT</td>
<td>Portugal</td>
</tr>
<tr>
<td>22</td>
<td>RO</td>
<td>Romania</td>
</tr>
<tr>
<td>23</td>
<td>RS</td>
<td>Serbia</td>
</tr>
<tr>
<td>24</td>
<td>SK</td>
<td>Slovak Republic</td>
</tr>
<tr>
<td>25</td>
<td>SI</td>
<td>Slovenia</td>
</tr>
<tr>
<td>26</td>
<td>ES</td>
<td>Spain</td>
</tr>
<tr>
<td>27</td>
<td>SE</td>
<td>Sweden</td>
</tr>
<tr>
<td>28</td>
<td>CH</td>
<td>Switzerland</td>
</tr>
<tr>
<td>29</td>
<td>TR</td>
<td>Turkey</td>
</tr>
<tr>
<td>30</td>
<td>UK</td>
<td>United Kingdom</td>
</tr>
</tbody>
</table>
References

Managing municipal solid waste - a review of achievements in 32 European countries, EEA Report No 2/2013


ETC/SCP, 2012b, Overview of the use of landfill taxes in Europe, ETC/SCP working paper, 1/2012.


ETC/SCP, 2013g, Municipal waste management in the United Kingdom, February 2013.
ETC/SCP, 2009. Country fact sheets on Waste policies


Eurostat news release 48/2012, Landfill still accounted for nearly 40% of municipal waste treated in the EU27 in 2010, 27 March 2012

Eurostat Commission - STAT/13/33, 4 March 2013

Eurostat, 2013 (online data code: demo_gind)

Eurostat, 2011 (online data code: env_wasmun)

Eurostat, 2011 (online data code: env_wasmun)

Eurostat, 2012 (online data code: nama_gdp_c)