Country fact sheet

Municipal waste management

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Luxembourg

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European Environment Agency
European Topic Centre on Waste and
Materials in a Green Economy

Context

This country profile was prepared within the EEA's work on municipal waste, resulting in the following outcomes:

- 32 country profiles (this document) – The country profiles were originally produced by the ETC/SCP and were published by the EEA in 2013. The ETC/WMGE updated them for the EEA under its 2015 and 2016 work programme.

- An EEA briefing on Municipal waste management across European countries

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Related country profiles

Country information on waste prevention programmes can be found at:
http://www.eea.europa.eu/publications/waste-prevention-in-europe-2015

For country profiles on material resource efficiency policies, please visit:
http://www.eea.europa.eu/publications/more-from-less/

Contents

Highlights

- Luxembourg is among the countries generating the highest amount of municipal solid waste (MSW) per person in Europe – 616 kilograms per person in 2014. It has, however, achieved a rather high rate of separately collected MSW.
- The total recycling rate increased from 37 % in 2001 to 47 % in 2014.
- Landfilling and incineration rates have constantly decreased between 2001 and 2014, and there is no need for new landfilling or incineration capacities.
- The EU Landfill Directive's targets to divert biodegradable municipal waste (BMW) from landfill were met by 2006.
- MSW has to be pre-treated prior to landfilling.
- Luxembourg plans to expand its network of waste-container parks so that this is one park for every 10 000–15 000 inhabitants. Almost 100 % of the population has access to at least one separate organic waste collection scheme.
- Luxembourg plans to promote second-hand shops at waste-container parks.

1 Introduction

1.1 Objective

Based on historical municipal solid waste (MSW) data for Luxembourg, and EU targets linked to MSW in the Waste Framework Directive (WFD), the Landfill Directive and the Packaging Directive, the analysis undertaken includes:

- the historical MSW management performance based on a set of indicators;
- uncertainties that might explain differences in country performance, which may relate more to variations in reporting methodology than differences in management performance;
- indicators relating to the country's most important initiatives taken to improve the management of MSW; and
- future possible trends.

2 Luxembourg's municipal solid waste management performance

Luxembourg is the smallest Member State in the EU after Malta. It is among the countries generating the highest amount of MSW per person in Europe – 616 kilograms per person in 2014, but at the same time has one of the highest rates of separately collected MSW. Due to the early installation of a network of waste-container parks, Luxembourg has achieved a high material recycling rate, 28 % in 2014. Furthermore, both landfilling and incineration rates steadily decreased between 2001 and 2014.

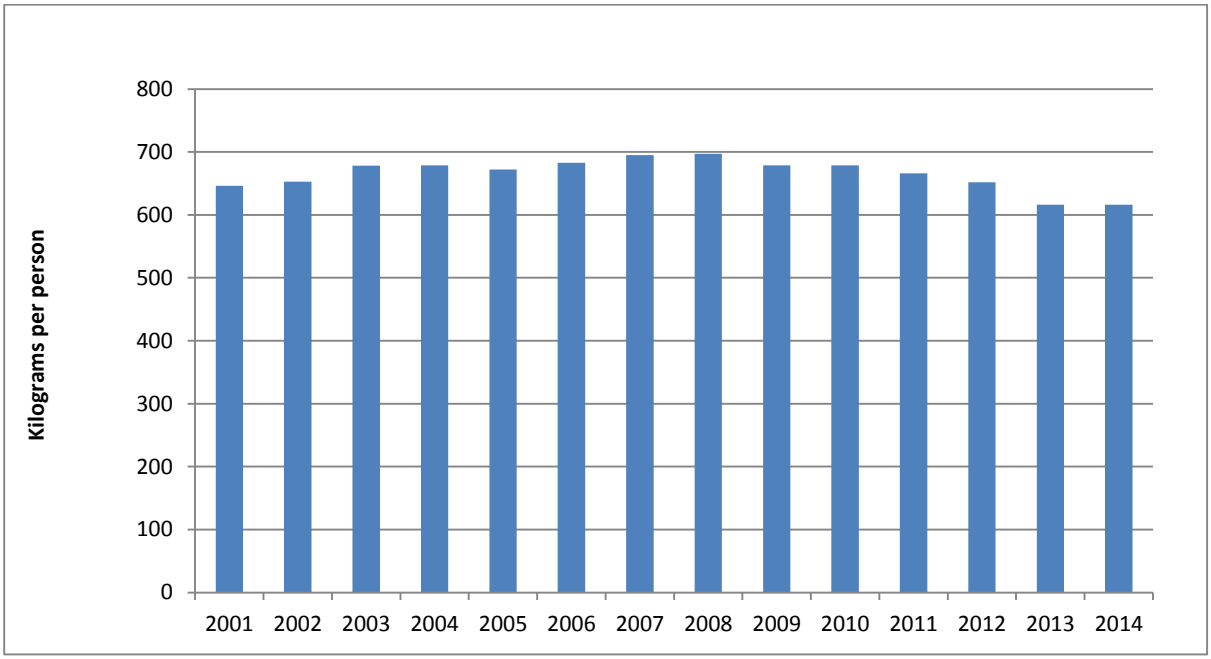
The legal framework for waste management, originally shaped in 1994, has recently been replaced by the 2012 Waste Management Law. The other fundamental instrument that drives the waste management policy is the Waste Management Plan, adopted in 2010, which will be revised in 2016.

2.1 Municipal solid waste indicators

The following indicators illustrate the development of MSW generation and management between 2001 and 2014. All percentages have been calculated by relating the waste managed to the generated amount, although the generated amount is equal to the managed amount over the same period.

Figure 2.0 shows the development of MSW generation per person in Luxembourg from 2001 to 2014. The country is among those generating the highest amount of MSW per person in Europe, 616 kilograms per person in 2014, and well above the EU average of 474 kg per person (Eurostat, 2016), reflecting the impact of high incomes on consumption levels, as well as the impact of 150 000 daily commuters. The figure also shows that there has been a stabilisation during the period, and a decreasing trend since 2008.

Figure 2.0 Luxembourg, municipal solid waste generation, 2001–2014



Source: Eurostat 2016. The data for 2014 is a Eurostat estimate.

2.1.1 Recycling of municipal solid waste, 2001–2014

This analysis addresses material recycling, composting and anaerobic digestion of MSW and total recycling – material recycling and organic recycling, combined.

Apart from slight declines in 2004 relative to 2003 and in 2011 relative to 2010, the total recycling rate of Luxembourg has steadily increased from 37 % in 2001 to 47 % in 2014, reaching 160 000 tonnes in absolute terms (Figure 2.1) (Eurostat, 2016). More than 95 % of the municipal waste recycled is exported for treatment, mainly to Belgium, France, Germany and the Netherlands, but these amounts are included in the whole time series (Eurostat, 2013; OECD, 2010).

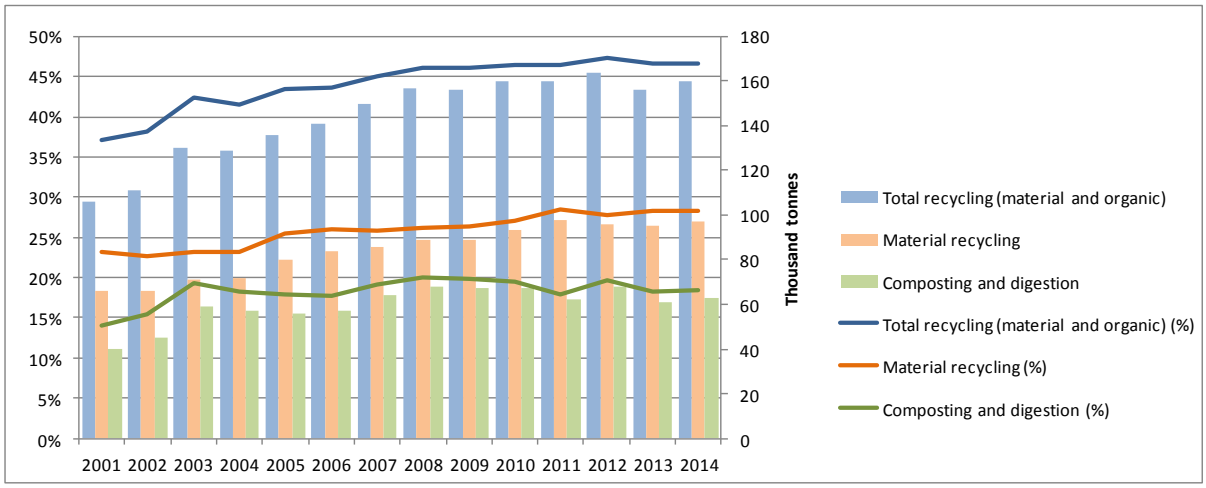
The material recycling rate has been historically higher than the organic recycling rate, but both show a similar trend in the 2001–2014 period. Indeed, organic recycling rose from 14 % in 2001 to 18 % in 2014, while material recycling, in the same period, increased from 23 % to 28 % (Eurostat, 2016).

The EU's 2008 WFD includes a target for certain fractions of MSW: 'by 2020, the preparing for re-use and the recycling of waste materials such as at least paper, metal, plastic and glass from households and possibly from other origins as far as these waste streams are similar to waste from households shall be increased to a minimum of overall 50 % by weight'. EU Member States may choose between four different methodologies to calculate compliance with the target[1]. Luxembourg has chosen method 2 and, according to the last available data, has reported a recycling rate of 50 %, based on this methodology (Luxembourg, 2016). The recycling rates shown in this paper correspond to method 4, the only method for which time series data exist. In 2015, the European Commission has proposed new targets for municipal waste of 60 % recycling and preparing for reuse by 2025 and 65 % by 2030, based on only one calculation method, and with the option of time derogations for some countries (EC, 2015).

[1] Commission Decision 2011/753/EU allows countries to choose between four different calculation methods to report compliance with this target. Member States have the option of considering four alternative waste streams and fractions:

1. paper, metal, plastic and glass household waste;
2. paper, metal, plastic, glass household waste and other single types of household waste or of similar waste from other origins;
3. household waste;
4. municipal waste (the method used in this document).

Figure 2.1 Luxembourg, recycling of municipal solid waste, 2001–2014, per cent and tonnes



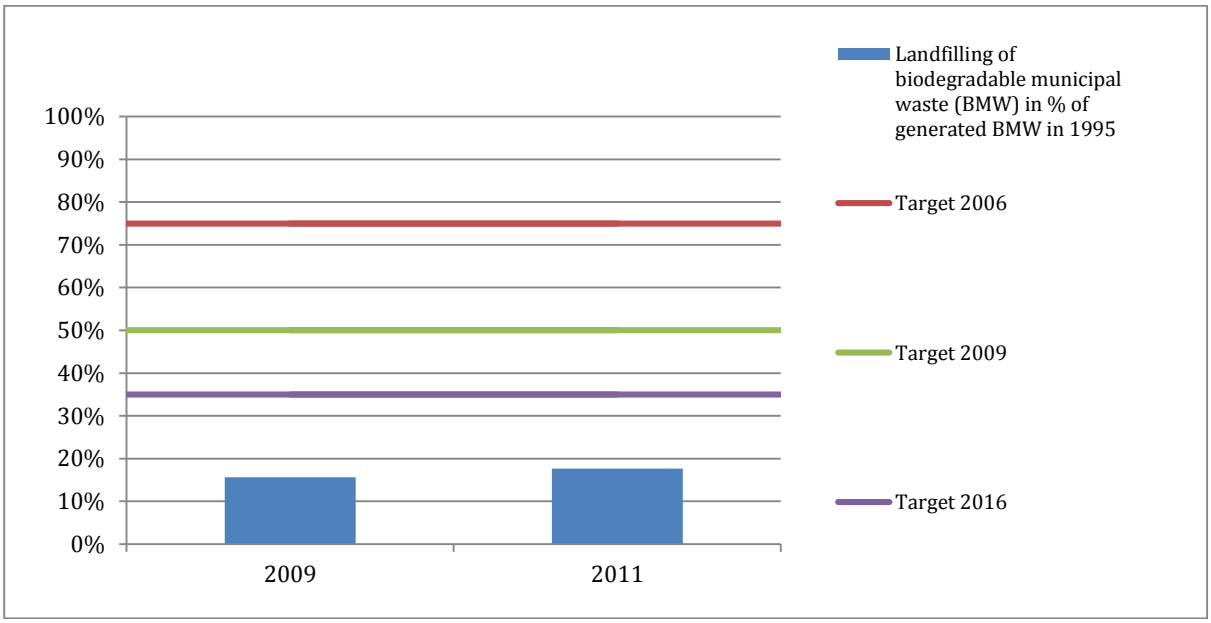
Source: Eurostat, 2016. The data for 2014 is a Eurostat estimate.

According to the chosen methodology, the country has already met the WFD target. Based on method 4, the country has a recycling rate of 47 % in 2014, with an average annual increase rate over the 2001–2014 period of about 1 percentage point.

2.1.2 Landfilling of biodegradable municipal waste

The historical percentage of biodegradable municipal waste (BMW) landfilled, compared to the amounts landfilled in 1995, was calculated to assess the level of compliance with the diversion targets of the Landfill Directive 1999/31/EC (EC, 1999).

Figure 2.2 Luxembourg, landfilling of biodegradable municipal solid waste, 2006 and 2009, % of biodegradable municipal waste generated in 1995



Source: EC, forthcoming

According to the Directive, Member States are to reduce the amount of BMW landfilled to 75 % of the total amount of BMW generated in 1995 by 2006; 50 % by 2009; and 35 % by 2016. As shown in Figure 2.2, Luxembourg reached all of its targets in 2006.

According to the national regulation transposing the Landfill Directive, the Grand-Ducal Regulation of 24 February 2003, all MSW has to be pretreated prior to landfilling. Luxembourg has decided, pursuant to the 2010 Waste Management Plan (PGGD, 2010), to further reduce the BMW sent to landfill by aiming for a reduction of the mixed municipal (residual) waste generated by households. The proportion of organic matter in residual waste collected door-to-door is still high at 30 % for biological waste and 19 % for paper and cardboard (Luxembourg, 2016). This points to an unexploited potential for further capture of these wastes from the mixed municipal (residual) waste.

2.1.3 Regional differences in municipal solid waste recycling, 2001–2013

No regional data is reported for Luxembourg.

2.1.4 The relationship between landfill tax and recycling rates of municipal solid waste

The objective of this analysis is to assess whether fiscal instruments, and more specifically landfill and incineration taxes, have had an effect on the recycling rate.

In Luxembourg, no landfill tax has been introduced. However, with a typical gate fee of EUR 149.48 per tonne of non-hazardous municipal waste, Luxembourg is among the EU Member States applying high total charges – gate fee plus eventual landfill tax – for disposal to landfill (BIO Intelligence Service, 2012).

At the same time, it has to be underlined that both the landfill and incineration rates have fallen since 2001. In 2014, 35 % of MSW was incinerated, well above the EU average of 27 %, and 18 % was landfilled, well below the EU average of 28 % (Eurostat, 2016[2]).

Moreover, according to the 2010 Waste Management Plan, the collection system gives incentives for prevention and separate collection of municipal waste. The system includes:

- basic waste collection fees to cover waste management administration, logistics and infrastructure;
- a pay-as-you-throw (PAYT) fee charged by weight for mixed municipal (residual) waste;
- a fee related to the collection frequency for mixed municipal (residual) waste;
- a PAYT system for organic waste collection;
- a collection fee for household bulky waste;
- a collection fee for specific waste fractions; and
- a fee for the collection of specific waste fractions going to specific waste treatment plants.

However, the definition and implementation of the existing and future waste management fees are the responsibility of each municipality and, therefore, vary.

2.1.5 Environmental benefits of better municipal solid waste management

Figure 2.3 shows a scenario for greenhouse gas emissions from MSW management in Luxembourg. The scenario assumes a yearly growth rate of 1.7 % for municipal waste for 2011–2015 and 1.6 % for 2015–2020. The scenario also assumes that EU targets for municipal waste are fully met. The calculation of emissions is based on data and assumptions in the European Reference Model on Municipal Waste Generation and Management. The approach taken in the model is rooted in life-cycle thinking, in that it considers not only direct emissions, but also avoided emissions associated

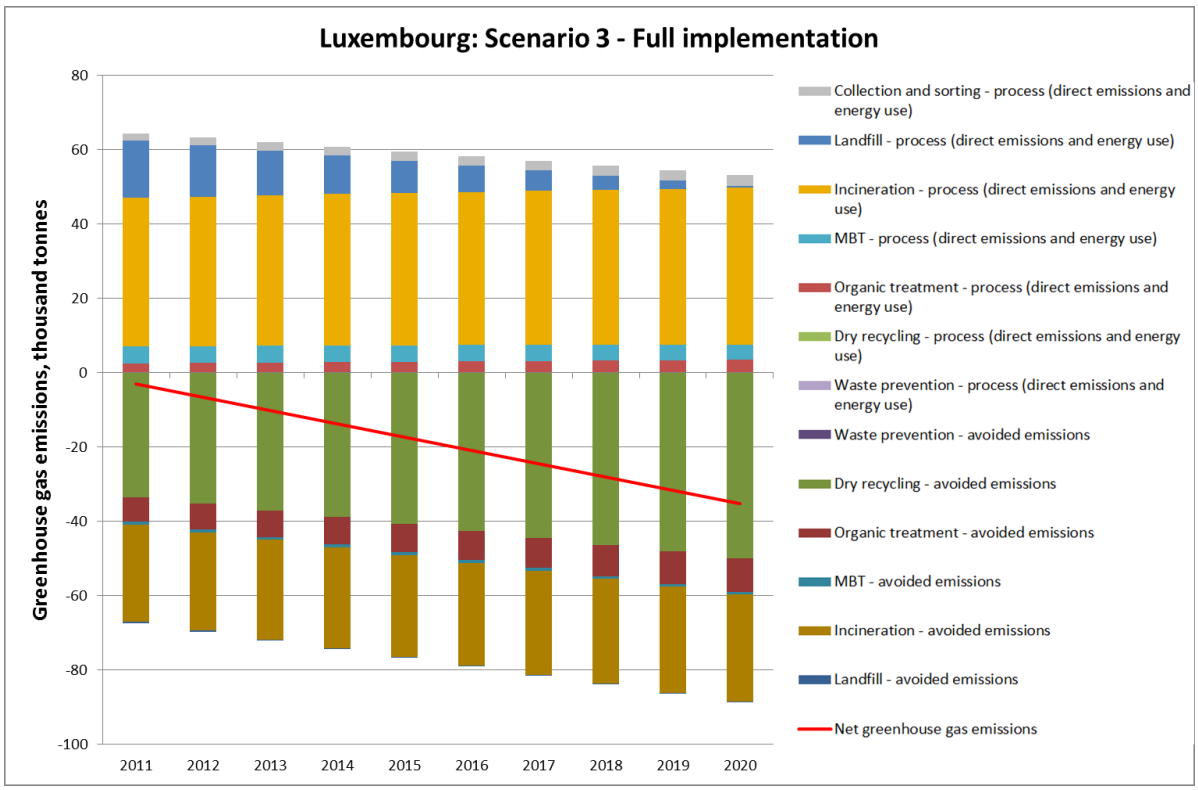
[2] With regard to Luxembourg, the data for the year 2014 is estimated by Eurostat.

with the recycling of materials, and the generation of energy from waste management processes. The more detailed methodology is described in Gibbs *et al*. (2014b). The level of emissions depends on the amount of waste generated and the treatment it undergoes each year.

Figure 2.3 shows direct emissions, avoided emissions and net emissions resulting from the management of MSW. All the emissions (positive values) represent direct operating emissions for each waste management option. The phases of the waste management chain covered include waste prevention; material recycling; composting and anaerobic digestion; mechanical biological treatment (MBT) and related technologies; collection and sorting; incineration and landfill.

For avoided emissions (negative values), the calculations integrate the benefits associated with energy recovery and material recycling of paper, glass, metals, plastics, textiles and wood, and bio-treatment of food and garden waste from MSW. (Gibbs *et al.*, 2014c)

Figure 2.3 Luxembourg, scenario for greenhouse gas emissions from municipal solid waste management, 2011–2020



Source: ETC/WMGE, calculation based on the European Reference Model on Waste

Note: Results presented in this figure should not be used for the compilation of greenhouse gas reporting for the Intergovernmental Panel on Climate Change (IPCC) national inventory report, or be compared with IPCC figures, as the methodology employed here relies on life-cycle thinking and, by definition, differs substantially from the IPCC methodology.

MBT means mechanical-biological treatment.

In countries with a low landfill share and high recycling rate, waste treatment can have an overall positive impact on greenhouse gas emissions, reducing emissions from the economy as a whole. Luxembourg is one of these countries. Based on the modelled scenario the net greenhouse gas emissions from the treatment of municipal waste were negative in 2011 and decrease over the whole modelled time period. The greenhouse gas emissions related to municipal waste management in Luxembourg are almost exclusively related to incineration while landfill contributes only marginally,

especially towards 2020. The decrease in net emissions is mostly due to the increasing amount of avoided emissions related to dry recycling as well as reducing emissions from landfill.

2.2 Uncertainties in the reporting

Some uncertainties or differences in how countries report MSW recycling can result in different recycling levels. This applies for example for the following issues:

- the extent of packaging waste from households and similar packaging from other sources included or not included in the MSW recycling reported;
- the definition of municipal waste used by the country, such as the inclusion or exclusion of home composting;
- the methodology used to report the inputs and outputs of MBT and sorting plants.

Luxembourg includes packaging waste from households in the reported amounts of MSW. Waste treated in MBT plants is reported based on outputs.

2.3 Important initiatives taken to improve municipal solid waste management

In Luxembourg, the original legal framework for waste prevention and management was shaped in 1994. On 21 March 2012, a new law regulating waste management was published. This defines the roles of different actors within the waste management system. In particular, the state performs coordination tasks and ensures the functioning of the SuperDrecksKëscht (SDK, see below), while municipalities are responsible for waste management and adopt provisions on waste prevention, waste management, and waste fees and tariffs. The 2012 Waste Management Law also introduced new recycling targets to be reached by 2020 and required the installation of facilities for separate collection of household waste in apartment buildings. Many implementing decrees are still to be adopted.

Another fundamental instrument which drives the waste management policy is the Waste Management Plan, which covers all waste types, except for radioactive waste and extractive waste. The first plan was produced in 2000 (PNGD, 2000) and included a number of qualitative objectives and quantitative targets to be achieved by 2005, compared to 1999, including:

- organic waste: 75 % recycling rate;
- packaging waste: 55 % recovery rate and 45 % recycling rate, and 15 % recycling rate for each material;
- household bulky waste: a reduction by 30 % per person;
- Final waste: reduction by 30 % per person; and
- Problematic waste[3]: 70 % separately collected.

The publication of the second Waste Management Plan in 2010 (PGGD, 2010), following an intermediary assessment in 2007 (Luxembourg Government, 2007), did not clearly indicate whether the targets of the first Plan had been met in 2005. According to a report by the OECD (2010), however, the targets, apart from the ones related to packaging waste and the collection of problematic waste, were not achieved.

The overall objectives of the 2010 Waste Management Plan are:

- to further promote prevention – measures related to prevention are integrated into different chapters of the 2010 Waste Management Plan and address, among the others, MSW, food and

[3] According to the Waste Management Plan, problematic waste includes both hazardous waste and waste which requires a specific treatment, such as waste electrical and electronic equipment (WEEE), paint, and batteries.

organic waste, packaging waste, waste electrical and electronic equipment (WEEE)/batteries; EEA, 2014);

- to reduce the quantity of mixed municipal (residual) waste sent to landfill and incineration;
- to reduce the generation of household bulky waste;
- to pretreat all mixed municipal (residual) waste collected before disposal; and
- to conduct an assessment of waste composition every three years.

The 2010 Waste Management Plan does not include any quantitative targets.

This Plan has been positively evaluated within the screening of *ex-ante* conditionality regarding the consistency of national waste management plans with the requirements of the WFD (Directive 2008/98/EC; total score of 8/10, classification green; Arcadis, 2014).

The 2010 Waste Management Plan will be revised in 2016 (Gibbs *et al.*, 2014a).

With regard to legislation addressing specific waste streams, the amended Grand-Ducal Regulation of October 31st 1998, as modified on 11st October 2013, transposed Directive 94/62/EC on packaging and packaging waste, as well as its 2004 revision (by Directive 2004/12/EC), into national law. Grand-Ducal Regulation of 30 July 2013 transposed the WEEE Recast Directive 2012/19/EU, while Law 19 December 2008 tranposed Directive 2006/66/EC on batteries and accumulators. There are three collective schemes in the country, namely for the management of packaging waste (Valorlux), WEEE (Ecotrel), and batteries (Ecobatterien). According to BIO Intelligence Service (2012), the collective scheme for packaging waste is relatively cheap compared to the ones of the other EU Member States, while also achieving high levels of recovery and recycling.

Household waste is collected through a mix of door-to-door schemes, bring banks, and civic amenity sites. Door-to-door is the main collection system for residual waste, paper, glass, and biowaste (single fractions), as well as for metal and plastic (co-mingled collection; BiPRO, 2015). Based on the 2010 Waste Management Plan, the waste-container park network needs to be expanded to achieve a density of one park for every 10 000–15 000 inhabitants. Indeed, the number of waste-container parks increased from 17 in 2000 to 23 in 2013; in 2010, they covered 90 % of the population (Luxembourg Statistics Portal, 2015; Gibbs *et al.*, 2014a). Furthermore, almost 100 % of the population has access to at least one separate organic waste collection scheme – through door-to-door collection or waste-container parks (PGGD, 2010).

With regard to the mechanism for funding collection services, in 2011, 188 613 inhabitants, around 37 % of the population, were covered by the PAYT system (Gibbs *et al.*, 2014a). Similarly to the 1994 Waste Prevention and Management Act, the 2012 Waste Management Law established that municipal waste fees are to cover waste management costs and be based on the weight or volume of waste generated. The planned extension of the PAYT system to cover the entire country has traditionally been held back by communal autonomy. Many of the municipalities are, therefore, still calculating their charges without reference to the real costs, often taking as their basis the size of the dustbin (OECD, 2010).

The collection of problematic waste from households has, since 1985, been carried out through the so-called SuperDrecksKëscht (SDK) programme[4], which is sponsored by the Environment Administration in cooperation with municipalities. A business component of the SDK has also been in place since 1992. The role and financing of the initiative, which is ISO 14001 certified, have had a legal basis since 2005 (Law of 25 March 2005). Moreover, the programme is imbedded in the first and second Waste Management Plans of the country, and is, therefore, considered as an inherent part of the waste management policy portfolio.

The household component of SDK programme includes (EEA, 2010):

[4] <https://www.sdk.lu/index.php/en/home >

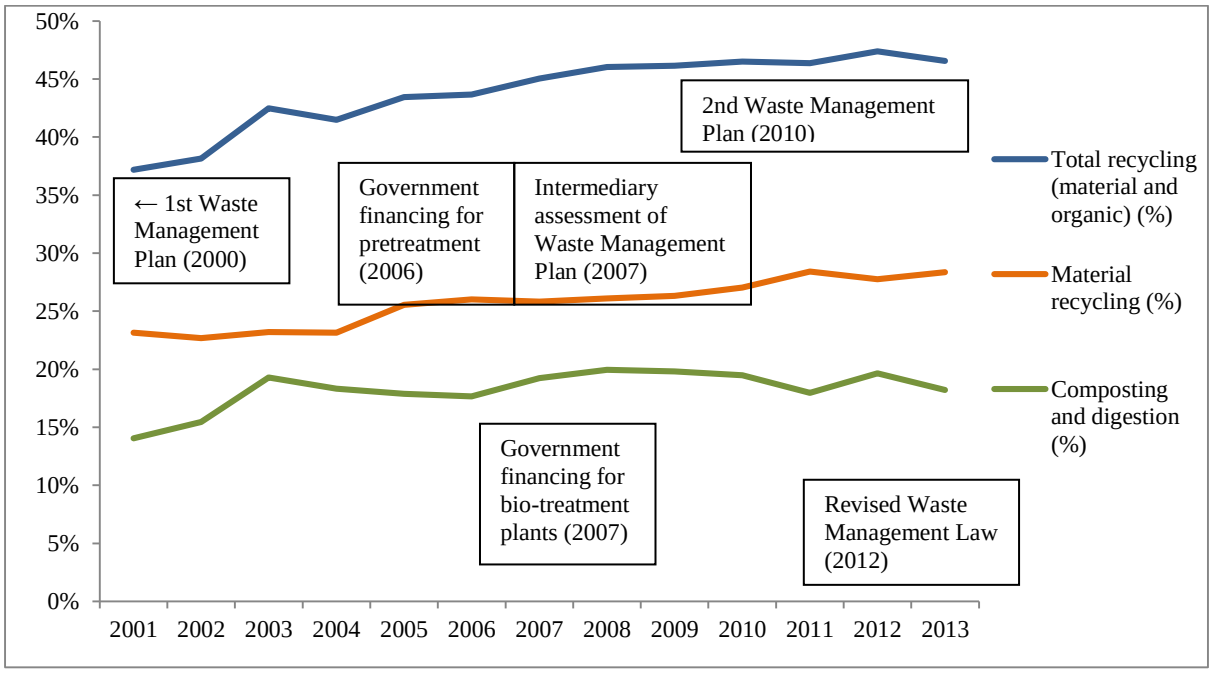
- collection by mobile containers, collection at fixed recycling centres, and home pick-up on request;
- actions targeting particular flows of waste, organised in cooperation with private partners, for example, of batteries, medications and syringes;
- information and awareness campaigns in schools and elsewhere;
- promotion of products that generate less waste, which are identified by a buy-smarter (*Clever akafen*) label on shelves and displays in shops and supermarkets.

The cost of the household component of SDK is fully covered by the government through the Environment Protection Fund.

Overall, it is difficult to assess the effect of SDK on recycling rates observed, but it is clear that the creation of a brand, with the active involvement of the staff of this organisation, has made a positive contribution to the recycling effort of the country.

Moreover, since 2007, the SDK concept has been exported in the form of franchise contracts that are available to the public authorities and public and private establishments in other countries seeking to create a waste management system along the lines of Luxembourg – for example, the household component of SDK has been implemented in Stockholm.

Figure 2.4 Luxembourg, recycling of municipal solid waste and important policy initiatives, 2001–2014



The network of MSW treatment facilities in Luxembourg includes the following (Luxembourg, 2016):

- 19 methanisation facilities for non-agricultural organic waste, with the exception of kitchen waste, with a total capacity of 120.034 Mg/year. With regard to the treatment of kitchen waste, according to the 2010 Waste Management Plan, a new methanisation facility was under construction and other two plants were in the authorisation phase;
- eight composting facilities, with a maximum capacity of 114 723 tonnes a year;

- one incineration plant, with a capacity of 176 000 tonnes a year. The 2010 Waste Management Plan indicates that there is no need for new incineration capacity and that it would be more beneficial to replace and upgrade the existing plant;
- two landfills for non-hazardous waste, with a total capacity of just over 1 million cubic metres. No additional landfilling capacity is required, except for the installation of inert landfills.

2.4 Future possible trends

The EU Landfill Directive's targets to divert biodegradable municipal waste from landfill were met in 2006.

The Waste Management Plan, published in 2010, as well as the 2012 Waste Management Law provide additional policy measures and directions, which were expected to improve the waste management performance of the country and move it further towards the top of the waste hierarchy. The policy includes institutional, infrastructural and waste-specific aspects that will likely improve future trends in material recycling.

Institutional aspects

Regarding monitoring of progress towards meeting waste management policies' objectives, some initiatives include the development of more systematic waste analyses and national waste statistics, carried out at the national level on a three-year basis. It is expected that this approach will provide a better understanding of waste management infrastructure requirements to optimise waste management.

The 2010 Waste Management Plan also requires a national waste management stakeholders' meeting to take place every two years. This indicates that, while the general direction of waste management policy, the Waste Management Plans, is only updated every ten years, new organisational infrastructure will be implemented to introduce a continuous active debate to monitor progress and eventually change the direction of the agreed plan.

Infrastructural aspects

The levels of waste collected separately for recycling are already rather high in Luxembourg and the country is confident that this will increase further with time. As a consequence of this expected trend, Luxembourg is not proposing to further increase its landfill or incineration capacities, except for landfills for inert waste. This gives a strong message that the overall objective of the waste management policy in Luxembourg is to collect and recover as much material as possible, including through material and organic recovery. The policy focus on recycling also includes requirements to increase the standards of existing bio-treatment plants and to develop further the bio-methanisation plants network.

The current waste policy also suggests that efforts will be made to further increase the network of waste-container parks, both stationary and mobile, as it is believed that this will lead to a further increase of recycling rates and a reduction of mixed municipal (residual) waste disposal. The objective is to systematically develop a waste-container park for every 10 000–15 000 inhabitants over the whole country.

The specific policy on household bulky waste includes the reduction of quantities sent to landfilling or incineration, the promotion of second-hand shops inside waste-container parks, with obligatory quality control of items before being sold, especially electrical appliances.

Other policy incentives towards higher level of recycling

It is interesting to note that the 2010 Waste Management plan includes some specific measures that should favour the collection of waste into separate fractions and enhance both the quantity and quality

recycling. For instance, the plan indicates that architectural standards will be revised to include separate collection specifications in newly built houses.

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