

Municipal waste management



Latvia 

October 2016

Photo: © MementImage



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](#)

Acknowledgements

The ETC/WMGE and the EEA would like to thank the Latvian Environment, Geology and Meteorology Center for reviewing the profile and providing valuable inputs.

Author affiliation

2016 updated version: Elina Merta, VTT Technical Research Centre of Finland (a partner in the ETC/WMGE)

2013 version: Danko Aleksic, Regional Environmental Center (a partner in the ETC/SCP)

EEA project manager: Almut Reichel

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	3
1 Introduction.....	4
1.1 Objective	4
2 Latvia's municipal solid waste management performance.....	4
2.1 Municipal solid waste indicators.....	5
2.1.1 Municipal solid waste recycling, 2001–2014	6
2.1.2 Landfill of biodegradable municipal waste	8
2.1.3 Regional differences of municipal solid waste recycling, 2001–2013	8
2.1.4 Recycling and landfill taxes	8
2.1.5 Environmental benefits of better municipal solid waste management	9
2.2 Uncertainties in the reporting.....	11
2.3 Important initiatives taken to improve MSW management	11
2.4 Possible future trends.....	13
References	14

Highlights

- Seventy-nine per cent of municipal waste generated in Latvia was still being landfilled in 2014.
- Municipal waste generation per person in Latvia, 325 kilograms per year in 2014, is considerably lower than the current EU average of 474 kilograms.
- Recycling of municipal solid waste (MSW) has increased since 2002, mainly material recycling, but the total rate of MSW recycling is still very low, 21 % in 2014.
- Latvia will need to increase its efforts to fulfill the EU recycling target of 50% of generated MSW by 2020.
- Latvia's landfill tax has increased considerably since 2008 but is still quite low compared to other European countries. The tax has so far provided a limited incentive for diverting waste from landfill.
- Latvia has managed to reduce the landfilling of biodegradable municipal waste (BMW) but still needs to make considerable efforts to meet the EU's targets of not landfilling more than 50 % of BMW generated in 1995 by 2013 and 35 % by 2020.

1 Introduction

1.1 Objective

Based on historical municipal solid waste (MSW) data for Latvia 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 performance on MSW management based on a set of indicators;
- uncertainties that might explain differences between the countries' performance which are more linked to differences of what the reporting includes than differences in management performance;
- indicators relating to the country's most important initiatives for improving MSW management;
- possible future trends.

2 Latvia's municipal solid waste management performance

The waste sector was poorly developed at the beginning of the 1990s, although collection systems for MSW were in place, along with some recycling facilities (MEPRD, 2012). The collected waste, however, was dumped in hundreds of uncontrolled sites that fell well short of EU environmental standards. The treatment of industrial and hazardous waste was also far from current EU standards, and water and soil contamination was prevalent (Baltic Environmental Forum, 2004).

Recognising waste management as a priority for environmental policy, various strategies and plans have been elaborated with the aim of developing an efficient waste management system complying with the EU and other relevant international waste management policy principles and requirements (Baltic Environmental Forum, 2004).

The Latvian Waste Management Act was adopted in 2001. It was amended in 2010, in order to implement the requirements of the EU Waste Framework Directive (BiPRO, 2012). Policy planning regarding waste management in Latvia is carried out at national, regional and municipal levels. The Ministry of Environmental Protection and Regional Development is responsible for preparing the National Waste Management Plan (NWMP). The first NWMP was adopted in 2002 followed by the NWMP for 2006–2012, approved in 2005. Finally, the revised NWMP for 2013–2020 was published in 2013. In addition, one regional waste management plan has been adopted by the municipalities of the relevant waste management region, while two further regional plans are under elaboration (LEGMC, 2015). The regional and local plans, however, are no longer required by the amended Latvian Waste Management Act (Arcadis, 2014; BiPRO, 2014). Latvia is divided into 110 municipalities and 10 waste management zones. Local governments are responsible for household waste management in their administrative territories. According to the Waste Management Act, local governments organise the management of household waste, including hazardous waste produced by households, in compliance with the national and regional waste management plans within their administrative territories (Arcadis, 2014; Gibbs *et al.*, 2014). In cases of non-compliance with the national regulations, matters are solved by using administrative measures that require explanation of the situation and details of measures to correct it (LEGMC, 2015).

Municipalities also have the responsibility for the procurement of MSW management services. The division of the municipal administrative territories into household waste management zones allows a

municipality to have two or more waste management companies collecting waste in the respective administrative territory (MEPRD, 2012).

Municipal waste collection schemes are run in parallel with packaging waste collection schemes and collection schemes for hazardous waste. In September 2014 there were 3 071 collection points serving inhabitants for the separate collection of waste and 65 civic amenity sites for municipal waste (LEGMC, 2015). At present, the collection coverage is 86 % leaving 14 % of the population without formal waste collection services. The collection system is organised by private companies (50 % of the population) or by the municipalities (50 % of the population). There is no information available on the share of door-to-door collection and collection points, though Gibbs *et al.* (2014) estimate that the latter constitute the majority of collection coverage (Gibbs *et al.*, 2014; BiPRO, 2012). There are 13 plants for mechanical sorting and 23 plants for manual sorting of municipal waste in operation throughout Latvia as of September 2014. There are no waste incineration plants, but very small tonnages of certain waste types are co-incinerated at cement kilns. In addition, there are 13 operational composting facilities and two anaerobic digestion plant in Latvia for biodegradable waste treatment. The first mechanical biological waste treatment (MBT) plant started operation in 2011 (LEGMC, 2015; Gibbs *et al.*, 2014; BiPRO, 2012). At the moment there are 11 active landfills in Latvia, all of which are compliant with EU requirements. All other existing landfills no longer receive wastes for disposal, but not all of them have been re-cultivated yet (LEGMC, 2013). The majority of MSW generated in Latvia, 79 % in 2014, is still landfilled (Eurostat, 2016).

Since 1998, the number of waste dump-sites in Latvia for municipal/household waste has fallen from 558, 77 % of which were smaller than 2 hectares, to 99 sites in 2006. Due to the financial aid from the Cohesion Fund and European Regional Development Fund, 270 dump-sites have been closed and the land recovered (Latvia, 2009).

As reported to Eurostat, since 2008 all MSW generated in Latvia has been sent into final treatment operations. In 2011, however, there is a gap of 120 000 tonnes between the generated and treated amounts of municipal waste reported (Eurostat, 2016).

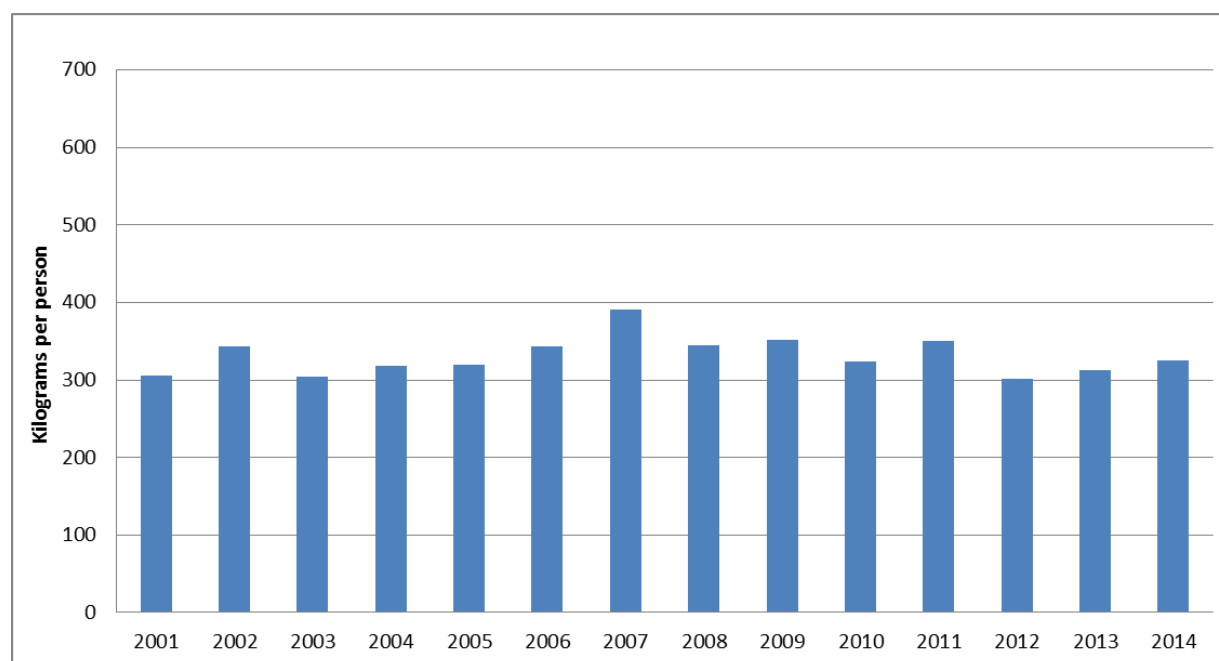
2.1 Municipal solid waste indicators

The following indicators illustrate the development of the Latvian MSW management for 2001–2014. All percentage figures have been calculated by relating the amount of waste managed to the amount generated rather than the amount treated. Relating to the total managed amount of MSW would generally result in higher rates for all waste management paths – as in the case of Latvia up to 2007.

Figure 2.0 shows the development of MSW generation per person in Latvia for 2001–2014. After a period of stabilisation, MSW generation peaked in 2007, followed by a slight but constant decrease thereafter. Generation of MSW per person in Latvia, 325 kilograms per year in 2014, is considerably lower than the current EU average of 474 kilograms.

According to official data, there was a substantial increase in 2006 in the amount of municipal waste collected – generated MSW is estimated based on amounts of collected waste. In 2008, 2009 and 2010 there was a significant recession in Latvia, which is likely to have been a major driver of this decrease in MSW generation (LEGMC, 2013).

Figure 2.0 Latvia, municipal solid waste generation per person, 2001–2014



Source: Eurostat, 2016.

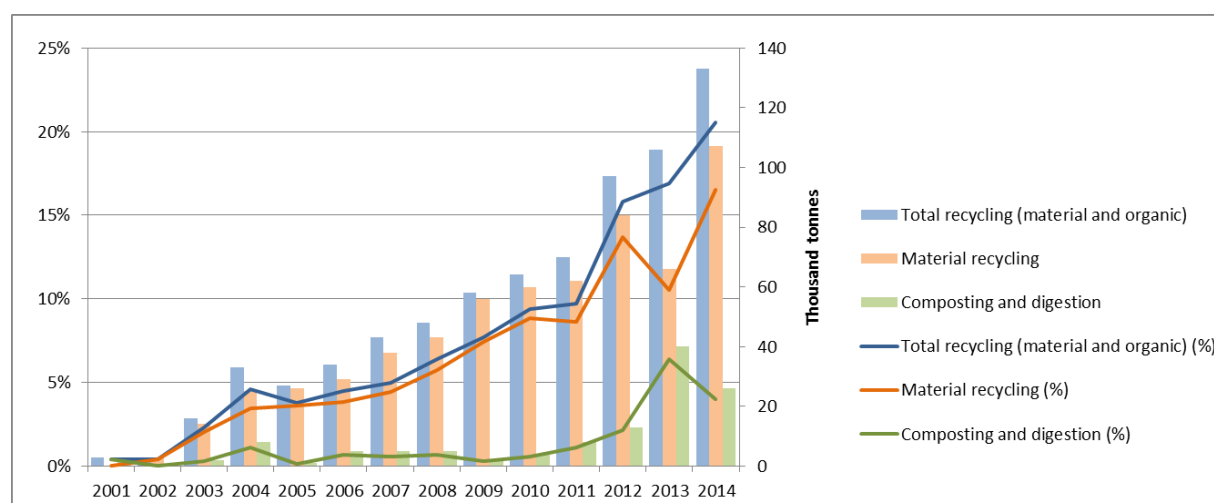
Note: the data for 2001 is estimated. There is a break in the time series from 2002 onwards, due to the use of a new data source (Eurostat, 2015).

2.1.1 Municipal solid waste recycling, 2001–2014

Figure 2.1 shows the development of recycling of MSW in Latvia in terms of the total recycling level, material recycling and organic recycling (compost and other biological treatment). The figure illustrates a positive trend in the recycling of MSW since 2002. After experiencing a slight drop ⁽¹⁾ in 2005 and 2006, the rate of MSW recycling has increased steadily ever since. The percentage of total recycled MSW, material and organic recycling, increased from 2.3 % in 2003 to 21 % in 2014.

⁽¹⁾ This drop may be explained as a statistical issue, not a real decrease in the amount. The recycling figures until 2004 have been calculated by relating the reported amounts of recycling to the collected amounts. From 2005 onwards, the percentages have been calculated by relating the recycling amounts to the (larger) generated amounts of MSW.

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



Source: Eurostat, 2016.

The total increase of recycling is almost entirely due to an increase in material recycling, which has risen from 2 % in 2003 to 17 % in 2014. The increase in organic recycling was almost non-existent for the period 2003–2010 after which it rose substantially. In 2013, though, there was an abrupt drop in the material recycling rate whereas organic recycling fell in 2014. Overall, however, the recycling percentages are still rather low and there is room for further improvement in both material and organic recycling.

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 ⁽²⁾. Latvia has chosen calculation method 4 (Gibbs *et al.*, 2014). The recycling rates shown in this paper also correspond to method 4, the only method for which time series data exist. In 2015, the European Commission 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, including Latvia (EC, 2015a).

In order to meet the recycling target of the Waste Framework Directive, Latvia has to increase its recycling rate with 29 percentage points by 2020, corresponding to 4.8 percentage points per year. This means that Latvia has to increase its recycling efforts.

² 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:

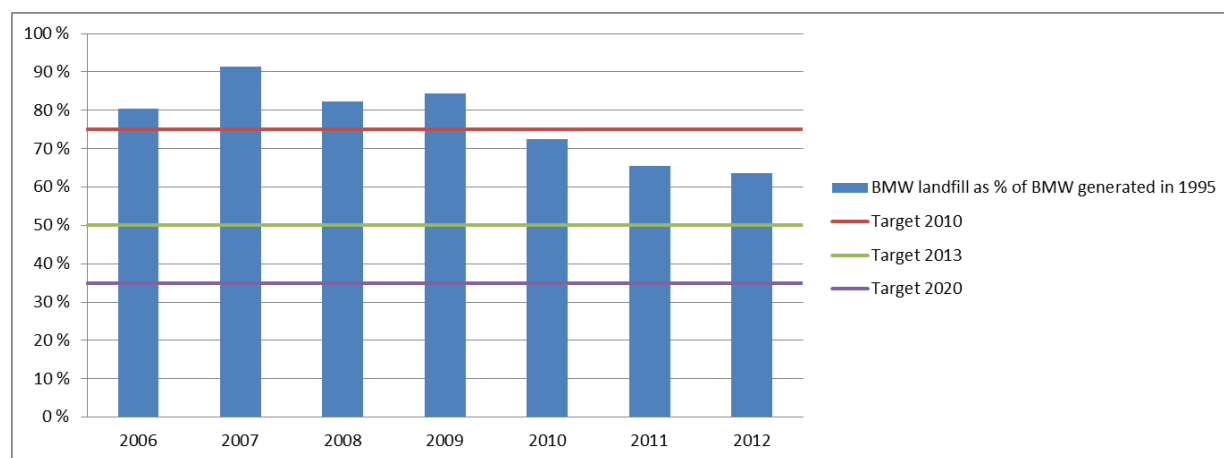
1. paper, metal, plastic and glass household waste;
2. paper, metal, plastic, glass household waste and other single types of household waste or of similar waste from other origins;
3. household waste;
4. municipal waste (the method used in this document).

2.1.2 Landfill of biodegradable municipal waste

According to the EU Landfill Directive, EU Member States have to reduce the amount of biodegradable municipal waste (BMW) landfilled by specific percentages by 2006, 2009 and 2016, relative to 1995 levels. As a country that landfilled more than 80 % of its MSW in 1995, Latvia has been granted a derogation period of four years and has thus to meet the targets by 2010, 2013 and 2020, respectively. In 1995, Latvia generated 460 000 tonnes of BMW.

Latvia has reported the landfilled amount of BMW to the European Commission for the years 2006–2012 (Figure 2.2). It met its target for 2010, landfilling 72 % of the amount of BMW generated in 1995. Since 2009 the amount of BMW landfilled has declined; nevertheless Latvia will need to make significant efforts to meet the 50 % target by 2013 and the 35 % target by 2020.

Figure 2.2 Latvia, landfill of biodegradable municipal waste, 2006–2012



Source: EC, forthcoming (data for 2009–2012); EC, 2014a (data for 2006–2008)...

Note: the target dates take account of Latvia's 4 year derogation period.

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

Latvia has not reported regional MSW recycling data to Eurostat.

2.1.4 Recycling and landfill taxes

Latvia introduced a landfill tax in 1991, within the Law on Natural Resources Tax and it was amended in 1996 and 2006 (ETC/SCP, 2012).

The taxpayers receive an individual landfill permit (ETC/SCP, 2012). Revenue from the tax is divided between the state budget, 40 %, and the special environmental protection budget, 60 %, which supports the municipalities in which landfills are located (ETC/SCP, 2012).

The rate of the landfill tax in the period from 2002 to 2008 was EUR 0.7 per tonne. In 2009, the rate was increased to EUR 1.78 per tonne, and has been increased yearly ever since, reaching the rate of around EUR 10 per tonne in 2012, and as of 1 January 2014, rate for the disposal of municipal was raised to EUR 12 per tonne. This still remains at a rather low level compared to other countries. There is a planned further increase in the tax rate for landfilling of waste as of 1 January, 2016. There is also a landfill tax for the disposal of hazardous waste (EUR 35.57 per tonne) (LEGMC, 2015).

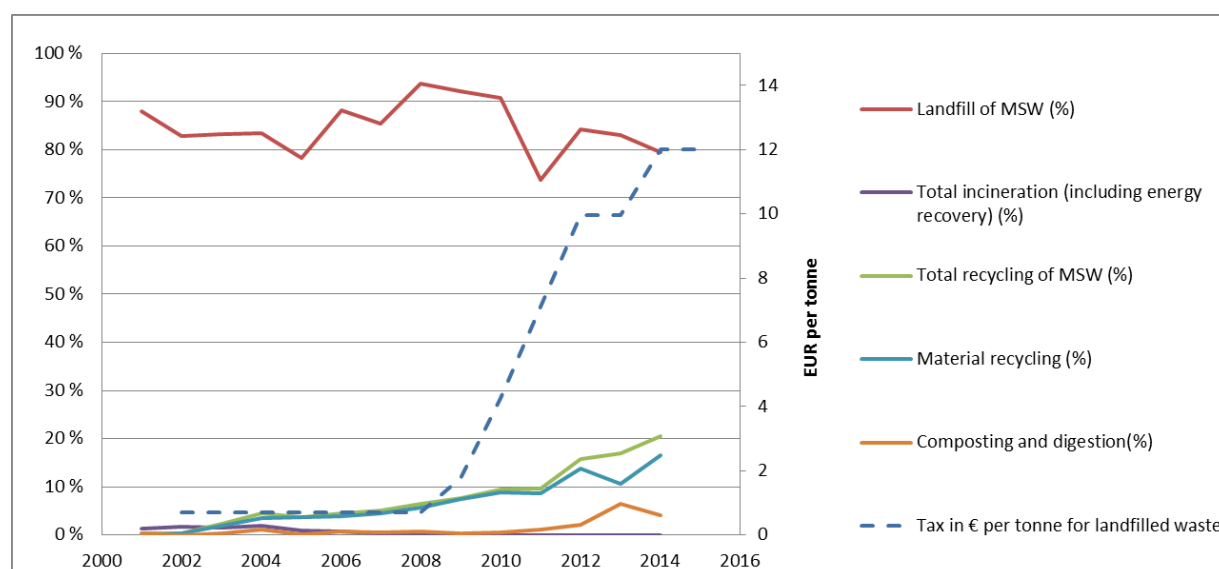
The increase in the landfill tax rate between 2001 and 2014 is presented in Figure 2.5 along with trends in the share of MSW recycled, incinerated and sent to landfill. Figure 2.5 shows that the rate of

landfilled MSW decreased steadily from 2001 to 2006, with no increase in the landfill tax in that period. The absolute amounts of MSW landfilled increased greatly from 2005 to 2006 due to an increase in the total generated amounts. Furthermore, for the years before 2007 there is no information about the treatment of between 10 % and 25 % of generated MSW. As such, it must be considered possible that the landfill rate could have been higher in the period from 2001 to 2007 than illustrated in Figure 2.5.

The rise in the tax since 2008 has not resulted in a significant reduction of the amount of MSW landfilled, likely because the level tax has been kept rather low. The landfill tax has also failed to make any impact on the level of incinerated MSW, which accounts for only a negligible fraction of MSW treatment.

Figure 2.3 shows that total recycling of MSW started to increase when the tax level was very low. Total recycling, which almost entirely material recycling, has increased slowly since 2003, while the landfill tax has increased annually since 2008. The apparent decrease in recycling in 2004–2006 was due to a change in the calculation methodology (Section 2.1.1).

Figure 2.3 Latvia, development of municipal solid waste recycling and landfill tax in Latvia, 2001–2015, per cent and EUR per tonne



Sources: Eurostat, 2016; LEGMC, 2015 and ETC/SCP, 2012

The landfill tax in Latvia is still quite low although it has increased considerably since 2008. It provided a limited incentive for diverting waste from landfills, and with the further increases in 2014 and 2016 this incentive became stronger for municipal waste. The tax also provides an income to the state budget, with the larger part of the revenue being used for environmental projects (ETC/SCP, 2012).

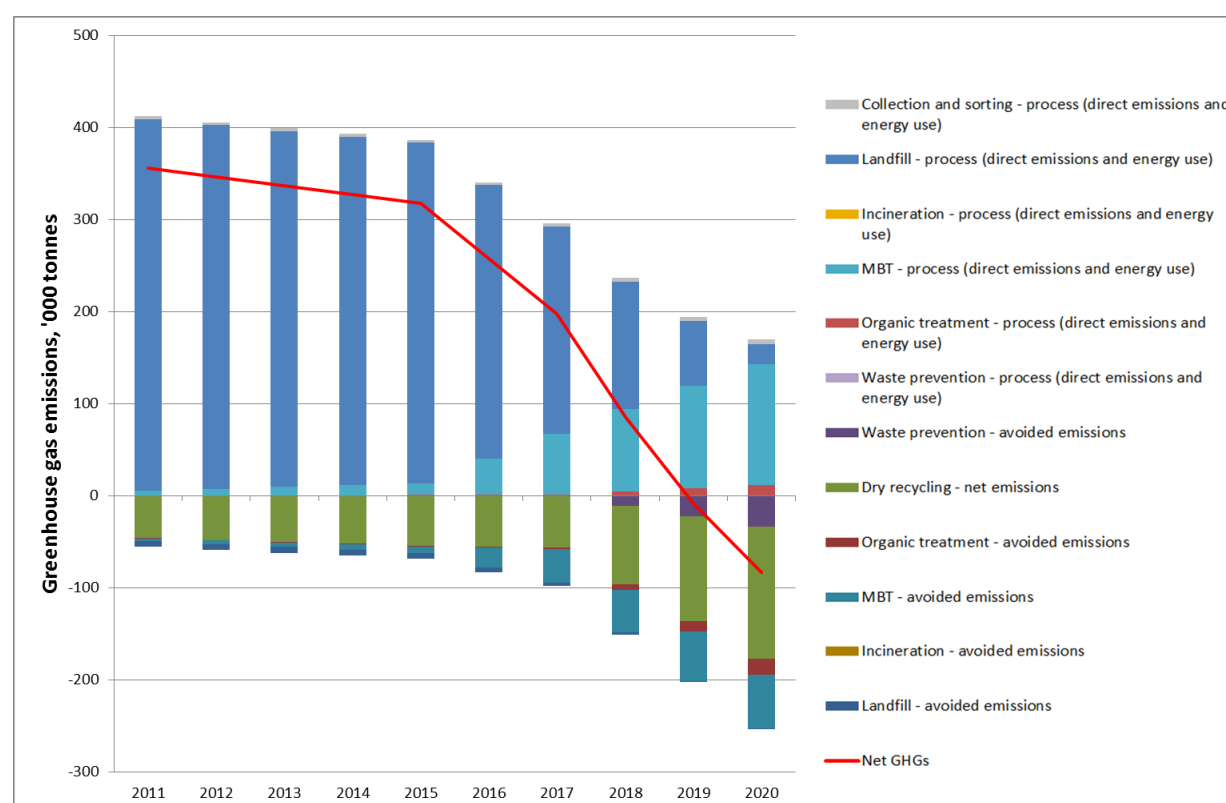
2.1.5 Environmental benefits of better municipal solid waste management

Figure 2.4 shows a scenario for the development of greenhouse gas emissions from MSW management in Latvia. The scenario assumes that municipal waste arisings remain constant in Latvia from 2011, and the full implementation of EU targets for municipal waste. The calculation of emissions is based on data and assumptions contained 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 with the recycling of materials, or the generation of energy by waste management processes. The more detailed methodology is described in Gibbs *et al* (2014a). The level of greenhouse gas emissions depends on the amount of waste generated and the treatment it undergoes each year.

Figure 2.4 shows the direct emissions, the avoided emissions and the net emissions related to MSW management. All the greenhouse gas emissions (positive values) represent the 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; MBT and related technologies; collection and sorting; incineration and landfilling. The graph is based on the assumption that the targets in existing legislation are fully implemented.

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

Figure 2.4 Latvia, 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.

Based on the modelled scenario with full policy implementation, the net greenhouse gas emissions from the treatment of municipal waste in Latvia are expected to decrease in the period 2011–2020. In the first modelled years of the scenario the direct greenhouse gas emissions related to municipal waste management are linked almost exclusively to landfilling and the benefits of recycling are relatively low. However, based on the modelled scenario with full policy implementation of the EU targets related to MSW, net greenhouse gas emissions from treatment of municipal waste in Latvia would be expected to be below zero by 2020. The reduction would be mainly due to avoided emissions from material separation and recycling as well as reduced emissions from landfills.

Greenhouse gas emissions from landfill are caused by the breakdown of organic wastes accumulated over past decades. In the model, which calculates landfill impacts over a 100-year period, the longer-term emissions from any given waste are attributed to the year in which that waste is deposited (Gibbs *et al.*, 2014a). Therefore, the positive effect of diverting BMW from landfill shows in the figures as an immediate reduction in greenhouse gas emissions from landfill.

2.2 *Uncertainties in the reporting*

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

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

Gibbs *et al.* (2014) report that according to information from the Latvian authorities, recycled packaging waste from municipal sources is not included in the national data causing underestimated recycling rates as well as underestimated amount of municipal waste generation. The National Waste Management Plan gives greater numbers for municipal waste generation and recycling compared to amounts reported to Eurostat. Furthermore, wastes similar to household waste from commercial sources (packaging and non-packaging waste) are not included in the reported amounts.

Significant amounts of sorted municipal waste are exported from Latvia for recovery in other Member States (in particular, metals; MEPRD, 2012). Waste exported for recycling to other Member States is not included in the amounts of recycled MSW that Latvia reports to Eurostat (LEGMC, 2015).

In Latvia, there is one MBT plant operating and nine further MBT facilities are planned. There is currently no information available on which method Latvia uses for the reporting of MSW treatment to Eurostat as regards the MSW treated in the existing MBT plant. For waste sorted at recycling stations, Latvia indicates that rejects are not included in recycling figures (Gibbs *et al.*, 2014).

In the data reported to Eurostat on municipal waste generation and municipal waste landfilled, there is a break in the time series from 2002 onwards due to the use of a new data source. There is no further information on the significance of the break (Eurostat, 2015).

2.3 *Important initiatives taken to improve MSW management*

The NWMP 2006–2012 was approved in December 2005, with the aim of preventing waste generation and promoting the recycling of waste. The new NWMP covering 2013–2020 was adopted in 2013, including a programme for waste prevention. The strategic objective of the NWMP is to move up the waste hierarchy. Focus is put on promoting improved treatment of biodegradable waste and restricting its disposal in landfills. The state will also introduce supportive measures for preparing for reuse and recycling of MSW (BiPRO, 2014). The NWMP sets out targets for municipal waste management (Gibbs *et al.*, 2014):

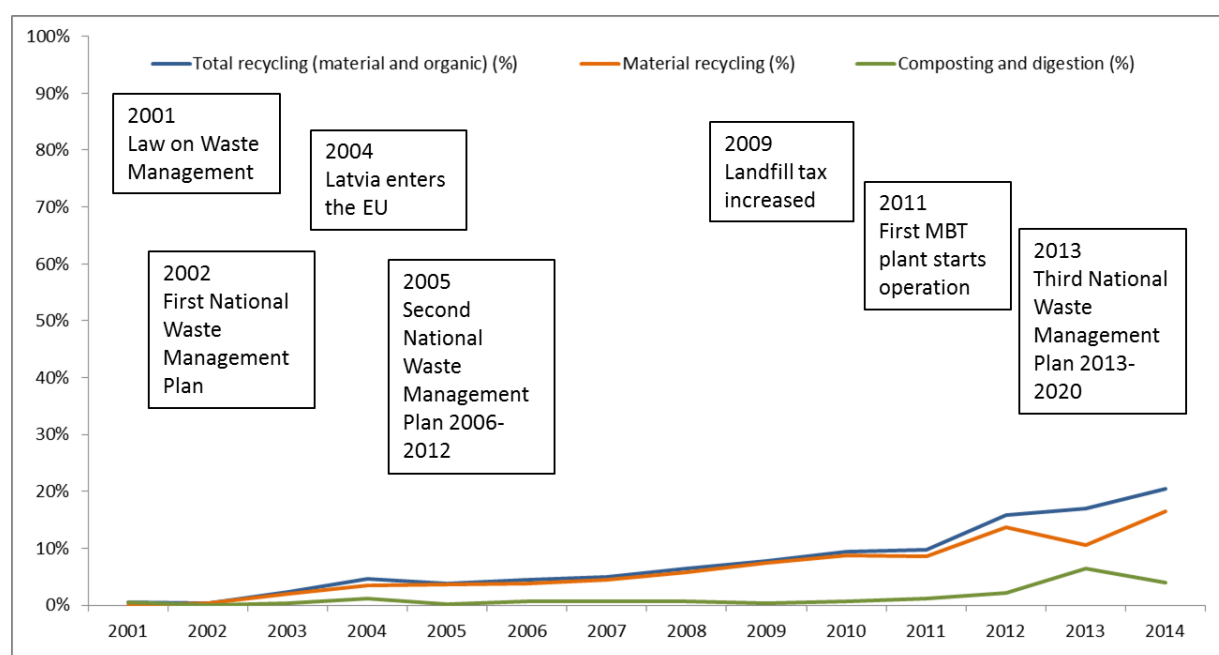
- prepare 50 % of household waste for reuse or recycling;
- by 2013, reduce landfill of biodegradable waste to 50 % of levels landfilled in 1995;
- by July 2020, reduce landfill of biodegradable waste to 35 % of levels landfilled in 1995;
- by December 2015, recover 60 % of packaging waste.

Plans to carry out activities to improve the separate collection systems for recyclables from municipal waste are in place in the NWMP. Furthermore, there is a plan to initiate separate collection for biodegradable waste and a collection point system for household hazardous waste, bulky waste and goods for reuse or preparation for reuse. A mandatory deposit scheme for beverage containers is identified in the plan as a key policy to be implemented. Such systems are crucial for achieving the targets mentioned above (BiPRO, 2014; Gibbs et al., 2014; EEA, 2010). There is a plan to increase the collection rate for packaging waste, waste electric and electronic equipment (WEEE) and batteries as of 2016 (LEGMC, 2015).

Producer responsibility organisations (PROs) are responsible for organising a certain number of collection points for environmentally harmful goods, packaging waste and disposable tableware. The system provided by PROs is additional to services organised by the government (Gibbs et al., 2014). There are extended producer responsibility (EPR) schemes in place in Latvia for batteries (three schemes), packaging waste (information on the number of schemes is not available) and WEEE (five schemes; EC, 2014b). No pay-as-you-throw (PAYT) schemes have been introduced to date.

The Latvian Waste Management Act prohibits the landfilling of liquid waste, sludge from wastewater treatment plants with a water content above 80 % and waste from the food and timber industry if not intended for composting or the generation of biogas. The ban was introduced in 2002 (BiPRO, 2012).

Figure 2.5 Latvia, recycling of municipal solid waste and important policy initiatives, 2001–2014



Source: Eurostat, 2016

In order to increase levels of awareness, numerous information campaigns addressing certain target groups, such as households, the public, businesses, schools, tourists and industry, have been organised (BiPRO, 2012). Competent authorities in Latvia have planned some measures in the field of municipal waste management. Among these are (BiPRO, 2012):

- re-cultivating closed non-compliant landfills and elimination of illegal dumpsites;
- improvement of technical conditions for waste processing and recycling;

- improvement of the conditions for separate collection by information campaigns and infrastructural investments including improving collection schemes;
- minimising the landfilling of municipal waste by improving alternative waste management infrastructure and use of financial tools;
- developing an appropriate tax and fee system starting with a basic approach to minimise landfilling, promote separate collection and prevent littering;
- implementing the polluter-pays principle fully;
- information and awareness campaigns to encourage the public to stop littering and improve environmental protection related to waste issues.

2.4 Possible future trends

It will require a very high yearly increase, almost 5 per cent a year in the recycling of MSW from 2014 to 2020 if Latvia is to fulfill the WFD target of 50% MSW recycling. This would require a huge effort from the government and local authorities, as well as a good level of co-operation between the public and private sector.

Recycling rates of MSW would be higher if some of the recycled packaging waste from MSW sources as well as waste exported for recycling were systematically included in the reporting of recycled MSW.

The NWMP for 2013–2020 requires all municipalities to ensure separate collection of waste streams (at least paper, cardboard, metal, plastic and glass) by 2015. This can be seen as an important measure for the country to increase material recycling rates. As for new infrastructure, there are plans to build nine MBT plants in the near future, currently one is operational. New composting facilities are also planned – in 2014, 13 composting facilities were operational. There are currently no plans for new thermal treatment capacity (Gibbs *et al.*, 2014; BiPRO, 2012). There are no national projections on the future municipal waste arisings in Latvia. The Latvian population, however, has been decreasing over the past two decades, and recently municipal waste generation has decreased despite the increases in gross domestic product (GDP). It is, therefore, estimated that the quantities of municipal waste will remain rather constant in the foreseeable future (Gibbs *et al.*, 2014).

References

Arcadis, 2014, *Screening of ex ante conditionality regarding the consistency of national Waste Management Plans, with the requirements of the Waste Framework Directive 2008/98*, under framework contract No ENV.A.2/FRA/2012/0032 – Lot 2. European Commission DG Environment Project number BE0013000458 | Draft final report version 2 | 13-02-2014

Baltic Environmental Forum, 2004, *Waste Management in the Baltic States*.

BiPRO, 2012, *Annex 7 Background information (country factsheets) PDF.zip. Support to Member States in improving waste management based on assessment of Member States' performance-Annex 7*, Draft, report by BiPRO on behalf of the European Commission under contract ENV.C.2/SER/2011/0034

BiPRO, 2014, *Detailed evaluation report for assessing the waste management plan of Latvia – National*. Final Draft – 15 July 2014. ENV.C.2/FRA/2013/0023.

EC, 2011, Commission Decision of 18 November 2011 establishing rules and calculation methods for verifying compliance with the targets set in Article 11(2) of Directive 2008/98/EC of the European Parliament and the Council

EC, 2014a, Member States' reporting to the Commission according to the Landfill Directive (1999/31/EC). E-mail from Bartosz Zambrzycki (European Commission) to Almut Reichel (the EEA) on 16 January, 2014.

EC, 2014b, *Development of Guidance on Extended Producer Responsibility (EPR)*. Final report. European Commission – DG Environment 2014.
(http://ec.europa.eu/environment/waste/pdf/target_review/Guidance%20on%20EPR%20-%20Final%20Report.pdf), accessed 21 August 2016.

EC, forthcoming, *Final Implementation Report for the Directive 1999/31/EC on the Landfill of Waste*, prepared by Eunomia Research and Consulting Ltd, ENT Environment and Management, EPEM S.A., Ekokonsultacijos and the Environmental Research Institute (ORZ) for the European Commission, DG Environment under Study Contract DG ENV.C.2/FRA/2013/0023. Draft report, forthcoming.

EC, 2015a, Proposal for a Directive of the European Parliament and of the Council amending Directive 2008/98/EC on waste (COM(2015) 595 final of 2 December 2015).

ETC/SCP, 2011, Bakas, I., Sieck, M., Hermann, T., Andersen, F. M., Larsen, H. and Reichel, A., 2011, *Projections of Municipal Waste Management and Greenhouse Gases*. ETC/SCP working paper 4/2011. Copenhagen, Denmark, 89 pp.
(<http://scp.eionet.europa.eu/publications/2011WP4>), accessed 21 August 2016.

ETC/SCP, 2012, *Overview of the use of landfill taxes in Europe*. Fischer, C., Lehner, M. and McKinnon, D.L. (eds.), ETC/SCP Working paper 1, 2012
(http://scp.eionet.europa.eu/publications/WP2012_1), accessed 21 August 2016.

ETC/SCP, 2013. *Municipal waste management in Latvia*. Prepared by DankoAleksic.

Eurostat, 2016, *Waste database municipal waste*.
(http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=env_wasmun&lang=en), accessed 13 June 2016

Eurostat, 2015. *Municipal waste (env_wasmun), Reference Metadata in Euro SDMX Metadata Structure (ESMS), country specific notes on municipal waste generation and treatment.* (http://ec.europa.eu/eurostat/cache/metadata/en/env_wasmun_esms.htm), accessed 21 August 2016.

Gibbs, A., Elliott, T., Vergunst, T., Ballinger, A., Hogg, D., Gentil, E., Fischer, C., Bakas, I. and Ryberg, M., 2014, *Development of a Modelling Tool on Waste Generation and Management” Appendix 1: Baseline Report.* Final Report for the European Commission DG Environment under Framework Contract No ENV.C.2/FRA/2011/0020.

Gibbs, A., Elliott, T., Ballinger, A., Hogg, D., Gentil, E., Fischer, C. and Bakas, I., 2014a, *Development of a Modelling Tool on Waste Generation and Management. Appendix 6: Environmental Modelling.* Final Report for the European Commission DG Environment under Framework Contract No ENV.C.2/FRA/2011/0020.

Gibbs, A., Elliott, T., Vergunst, T., Ballinger, A., Hogg, D., Gentil, E., Fischer, C. and Bakas, I., 2014b, *Development of a Modelling Tool on Waste Generation and Management. Headline Project Report.* Final Report for the European Commission DG Environment under Framework Contract No ENV.C.2/FRA/2011/0020.

Latvia, 2005, *The National Waste Management Plan 2006 – 2012* (in Latvian).

Latvia, 2009, *Environmental Policy Strategy 2009–2015.* (http://www.varam.gov.lv/eng/dokumenti/politikas_planosanas_dokumenti/), accessed 21 August 2016.

LEGMC, 2013, Latvian Environment, Geology and Meteorology Centre; E-mail sent on February the 5th 2013.

LEGMC, 2015, Information received during the Eionet consultation of the paper. E-mail of 9 December 2015 from Intars Cakars, Latvian Environment, Geology and Meteorology Centre.

MEPRD, 2012, Ministry of Environmental Protection and Regional Development of Latvia; E-mail sent on 10th August 2012.