

Municipal waste management



Finland 

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

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<http://www.eea.europa.eu/publications/more-from-less/>

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Highlights

- Recycling has consistently remained at a level of about 33 % of generated MSW between 2001 and 2014.
- Finland has to speed up its efforts if it is to meet the 2020 recycling target included in the EU Waste Framework Directive.
- The 2016 target of the EU Landfill Directive for diverting of biodegradable municipal waste from landfill was met in 2012.
- A ban on landfilling of non-pretreated municipal solid waste (MSW) and increases in landfill tax have been important policy initiatives in diverting municipal waste away from landfills.
- The creation of regional waste organisations has improved MSW management.
- Since 2007, municipal waste management in Finland has been characterised by a notable increase in incineration capacity that has contributed to diverting waste from landfills.

1 Introduction

1.1 Objective

Based on historical municipal solid waste (MSW) data for Finland, 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
- possible future trends.

2 Finland's municipal solid waste management performance

The Finnish legislation on waste, which is currently subject to a comprehensive reform process, generally follows the development of corresponding EU legislation but is, in part, more comprehensive and stricter. The Waste Act and some key decrees were renewed in 2011–2014 and other reform will continue throughout 2016. The general legislative framework on waste is established in the following acts and decrees:

- Waste Act 646/2011 (recent amendments 25/2014, 410/2014, 528/2014, 1062/2015, 1518/2015, 328/2016);
- Government Decree on Waste 179/2012 (recent amendments 332/2013 and 86/2015);
- Government Decree on Waste Incineration 151/2013 (amendment 101/2015);
- Government Decree on Landfills 331/2013 (amendment 103/2015);
- Environmental Protection Act 527/2014;
- Environmental Protection Decree 713/2014;
- Waste Tax Act 1126/2010 (amendments 651/2011, 970/2012, 534/2014 and 1072/2014).

In addition, several decrees have been issued on packaging waste management, the main one being the Government Decree on Packaging and Packaging waste 518/2014.

In April 2008, the government approved Towards a recycling society – The National Waste Plan (NWP) for 2016 (Finland, 2009). The NWP and its background documents contain a detailed description of future measures and targets. They include, moreover, a description of the status and development of the waste sector in Finland. This is the second NWP, following on from the first that covered 1998–2005. The NWP also presents the administrative and legal, economic and informative instruments to be used in implementation. It also includes a separate national waste prevention programme (EEA, 2014).

The NWP sets targets for 2016. One of the main ones is to maintain the volume of MSW 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 (Finland, 2009 and EEA, 2010). Regional waste management plans, taking account of regional conditions and development needs, are prepared in line with the NWP (Finnish Ministry of the Environment, 2015a).

The current NWP is under review, and a new plan for 2017–2022 is expected to be adopted by early 2017. The new plan will particularly target four waste streams – construction and demolition waste, biodegradable waste and nutrient cycles, waste electrical and electronic equipment (WEEE), and municipal waste (Finnish Ministry of the Environment, 2015a).

The Ministry of the Environment (MoE) is responsible for preparing national legislation and participates in the preparation of waste policies. The MoE also guides, develops and follows-up the interpretation and implementation of waste legislation. The six Regional State Administrative Agencies (AVIs) grant environmental permits for significant waste management facilities, such as landfills and incineration plants. Fifteen Centres for Economic Development, Transport and the Environment (ELY Centres) guide and monitor the waste management carried out by municipalities and companies, monitor compliance with environmental permits as well as granting approval for professional waste transporters. The ELY Centres have been responsible for preparing regional waste management plans but there are ongoing plans for eliminating this obligation. Furthermore, the ELY Centre of Pirkanmaa region has the responsibility of national monitoring of producer responsibility schemes. The Finnish Environment Institute is the authority that monitors international waste transport (Finnish Ministry of the Environment, 2015c).

Municipalities are responsible for organising the management of household waste and waste generated in public administration, services and education. In practice, most municipalities have outsourced the main part of municipal waste management to regional waste organisations that may contract private waste management companies for needed services. Currently an amendment concerning these responsibilities is being developed and wastes generated by public administration, services and education would become the responsibility of waste holder. The environmental protection authorities of municipalities grant environmental permits for small-scale waste management activities and monitor compliance of local actors with the Waste Act. (Finnish Ministry of the Environment, 2015b)

According to the Waste Act, waste management fees collected by the municipalities must cover the full cost of waste management. Waste tariffs and the grounds for them are set by municipalities. The fees are dependent on waste type, quality, quantity and number of pick-ups, as well as conditions for collection and transportation. The fee can also be based on the number of people living at a property if the quality and quantity of waste cannot be otherwise defined. In addition, the municipalities may charge a separate basic fee, a so-called eco-tariff, that covers the costs of providing waste information, keeping registers and other similar tasks related to waste management. There is also an extended producer responsibility (EPR) in place in Finland for several waste streams, including packaging waste (Finnish Ministry of the Environment, 2015b).

Formal waste collection services cover the entire population. Municipal waste management authorities decide whether waste collection is contracted by the regional waste company or directly by real estate owners. Mixed municipal (residual) waste is typically dealt with by door-to-door collection whereas recyclables are either collected door-to-door or subject to bring-site systems (Finnish Solid Waste Association, 2015).

All municipal waste for recycling is collected as source separated. The arrangement of door-to-door collection is based on municipal waste management regulations, which can contain obligations e.g. for separate collection of bio-waste, and paper and such packaging waste as cardboard, metal and glass. Households can also voluntarily join door-to-door collections of recyclables. There is typically one civic amenity bring site per municipality for a variety of household wastes including paper,

cardboard, glass, metal, wood, garden waste, construction and demolition waste, WEEE and hazardous waste (Finnish Solid Waste Association, 2015; Gibbs *et al.*, 2014a).

A deposit-refund system is in place for beverage containers. A beverage packaging tax of EUR 0.51 per litre is collected for some alcoholic and soft drinks, but becoming a member of an approved and operational return system or organising a new return system provides an exemption from the tax. The deposit ranges from EUR 0.1–0.4 per container (Palpa, 2015).

By the end of 2014, municipal biowaste was treated at 14 biogas plants (Huttunen and Kuittinen, 2015). Finland also has composting capacity in place for source separated bio-waste and residues from anaerobic digestion processes.

There are currently eight waste-to-energy plants in operation, and two further under construction, with a total annual capacity of around 1.7 million tonnes of waste, part of which is for industrial waste. In addition, some regular power plants have co-incineration capacity for solid recovered fuel (SRF) or refuse-derived fuel (RDF) produced from source separated waste materials (Finnish Solid Waste Association, 2015).

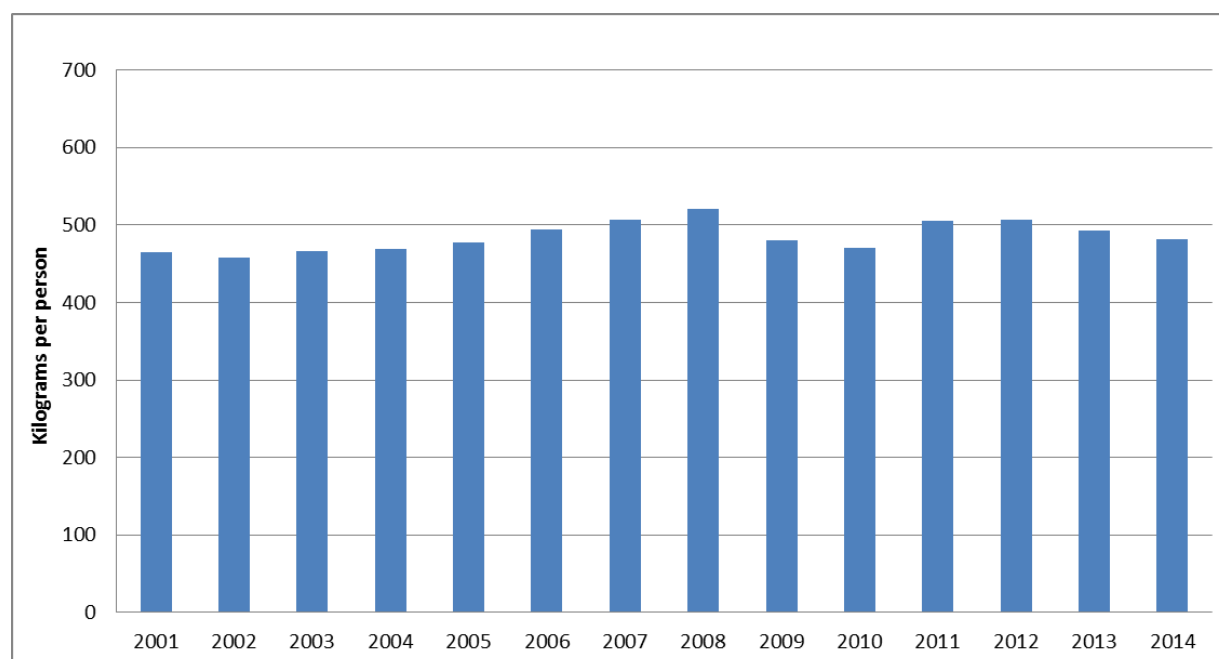
Finnish generation of MSW increased from 2.4 million tonnes in 2001 to 2.8 million tonnes in 2008, but has since decreased to 2.6 million tonnes in 2014. All municipal waste generated is treated (Eurostat, 2016).

2.1 MSW Indicators

The following indicators illustrate the development of the Finnish MSW management in 2001–2014. All percentage figures have been calculated by relating the waste managed to the generated amount – rather than the treated amount.

Figure 2.0 shows the development of MSW generation per person from 2001 to 2014. There was an increase from 465 kilograms per person in 2001 to 521 kilograms in 2008, since when it has decreased, to 482 kilograms per person in 2014. The decrease seems to be linked to the start of the economic crisis in 2008.

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



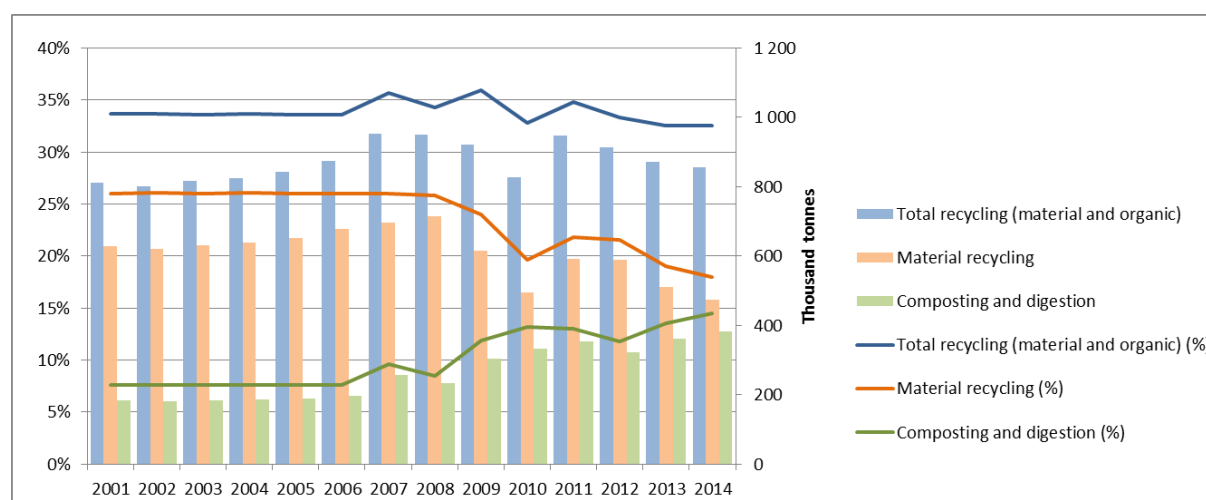
Source: Eurostat, 2016.

The share of MSW landfilled has decreased drastically in the recent years. In 2014, the figure was 458 000 tonnes compared to 1.4 million tonnes in 2008. The share of MSW landfilled fell from 51 % in 2008 to 17 % in 2014, whereas the share incinerated increased from 17 % in 2008 to 50 % in 2014. The share recycled remained almost unchanged over the same period.

2.1.1 The recycling of municipal solid waste, 2001–2014

Figure 2.1 shows the development of MSW recycling of in Finland. The total level remained almost constant between 2001 and 2014. There was a slight increase to 36 % in 2009, but by 2014 the rate had decreased again to 33 %.

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



Source: Eurostat, 2016

The constant level of total MSW recycling, however, hides differing trends in material and organic recycling. Material recycling of MSW has gone against the trend of most other EU countries, by decreasing. In 2001 628 000 tonnes, 26 % of MSW, was recycled, 715 000 tonnes or 26 % in 2008, and 474 000 tonnes, 18 % of MSW, in 2014.

Over the same period, organic recycling increased from 8 %, 180 000 tonnes, to 15 %, 382 000 tonnes, of generated MSW, mainly between 2007 and 2014. While there is room for improving both it appears especially important to increase material recycling.

The EU's 2008 Waste Framework Directive (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 for calculating compliance with the target¹. Finland has chosen method 4 (Gibbs *et al.*, 2014a), and 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 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)

Finland will have to increase its recycling rate by 17.5 percentage points in the period 2014–2020 according to the chosen methodology, corresponding to 2.9 percentage points per year. As in 2001–2014 the recycling rate decreased by 1.1 percentage points, calculated using data reported to Eurostat, method 4, Finland will have to increase its efforts if it is to meet the target.

2.1.2 Landfill of biodegradable municipal waste

According to the EU Landfill Directive, Member States have to reduce the amount of biodegradable municipal waste (BMW) landfilled by specific percentages by 2006, 2009 and 2016. For Finland the targets are related to the generated amount of BMW in 1994 when the country generated 2.1 million tonnes of BMW. Finland has reported the amount of its BMW landfilled to the European Commission for 2006–2012.

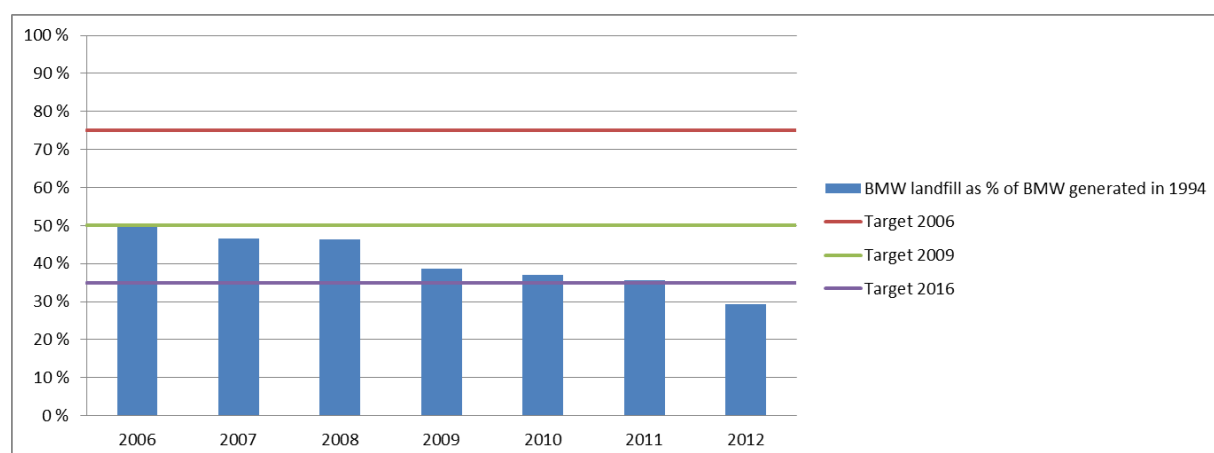
Figure 2.2 shows a steady reduction in the percentage of BMW landfilled, from 50 % in 2006 to 36 % in 2011, relative to amounts generated in 1994. From 2008 to 2009, there was a decrease of 7 percentage points, which can be explained by the fact that until late 2007 Finland had only one municipal waste incinerator and in 2007–2008 got two new incinerators were opened in Riihimäki, 60 kilometres north of Helsinki, and Kotka, 140 kilometres east of Helsinki, with a combined capacity of about 250 000 tonnes. It is evident that these two new incinerators have succeeded in diverting biodegradable waste from landfill.

Due to the reduction of landfilled BMW Finland has achieved the Landfill Directive's 2006 75 % target and the 2009 50 % target, and the country is on track to fulfil the 2016 35 % target.

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 2.2 Finland, landfill of biodegradable municipal waste, 2006–2012, % of biodegradable municipal waste generated in 1994



Source: EC, forthcoming; Finnish Environment Institute and Ministry of Environment, 2016

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

Finland has no regional recycling data to report to Eurostat.

2.1.4 Recycling and landfill taxes

The Finnish landfilling tax was introduced in 1996. The first Waste Tax Act was in force in the period of 1997–2010 and the second came into force at the beginning of 2011.

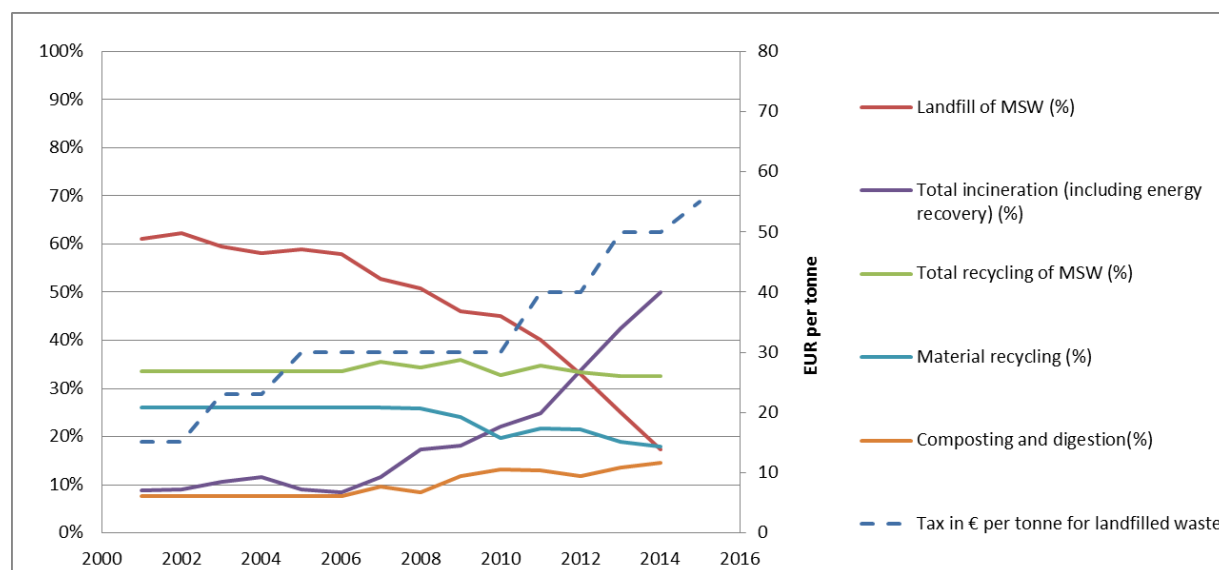
Municipal landfills and private landfill service sites that were not for disposing of own waste were within the scope of the first waste tax. Private industrial sites were not included (ETC/SCP, 2012b).

According to the second Waste Tax Act, tax is paid for landfilling any wastes that, from an environmental or technical point of view could be processed for recovery. The tax has increased in several steps from EUR 15.15 per tonne in 1996 to EUR 55 per tonne in 2015 (ETC/SCP, 2012b; Finnish Waste tax Act 1126/2010 with amendments). From 1 January 2016, the tax increased to EUR 70 per tonne (amendment 1401/2015 adopted in December 2015).

In general, the tax is not considered to have been significantly effective in promoting waste prevention and recycling, but rather it seems to have incentivised and increased recovery (ETC/SCP, 2012b).

Figure 2.3 illustrates the effect of the tax level rises in 2005 and 2011. The share of landfilled MSW dropped from 59 % to 45 % between 2005 and 2010 and to 25 % in 2013.

Figure 2.3 Finland, landfill tax and the development of recycling, landfill and incineration of municipal solid waste, 2001–2015, per cent and EUR per tonne



Source: Eurostat, 2016; ETC/SCP, 2012a; Finnish Waste tax Act 1126/2010 with amendments

It is expected that the 2013, 2015 and 2016 increases in the tax will provide further incentives for recycling and incineration of MSW. Additional effective policies, however, are needed to break the historical trend of diverting waste from landfill to incineration rather than to recycling.

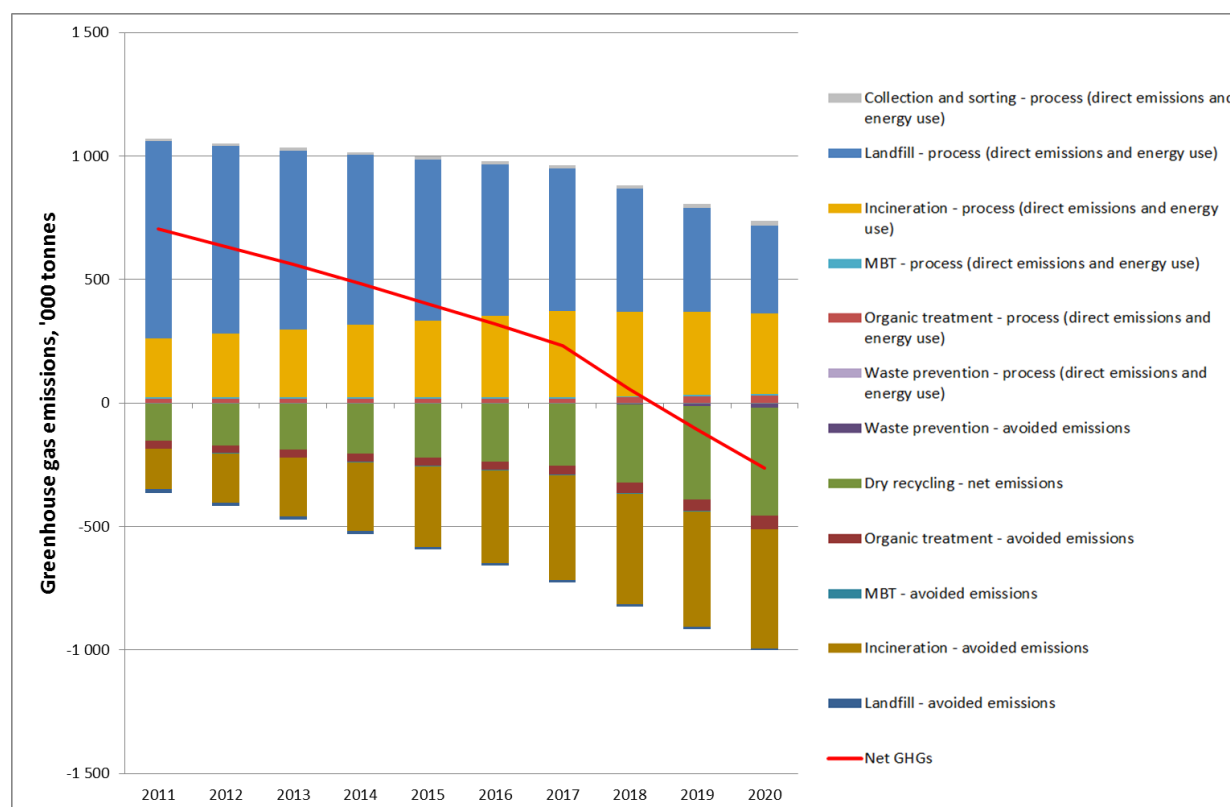
2.1.5 Environmental benefits of better municipal solid waste management

Figure 2.4 shows a scenario for greenhouse gas emissions from MSW management in Finland. The scenario assumes an average yearly increase rate of 1 % for municipal waste generation for the years 2011–2020 and that the EU targets for municipal waste were fully implemented. 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, and the generation of energy from waste management processes. The more detailed methodology is described in Gibbs *et al.* (2014b). The level of greenhouse gas emissions depends on the amount of waste generated and the treatment it undergoes each year.

Figure 2.4 shows direct, avoided and net emissions from MSW management. All the 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; mechanical biological treatment (MBT) and related technologies; collection and sorting; incineration and landfilling.

For the avoided emissions (negative values), the calculations integrate 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. The modelled scenario assumes full implementation of the existing EU targets on municipal waste management (Gibbs *et al.*, 2014c).

Figure 2.4 Finland, 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 implementation of EU targets, the net greenhouse gas emissions from the treatment of municipal waste in Finland are expected to decrease for the whole modelled period and reach zero in 2015–2016. In the first modelled years of the scenario, landfilling causes the largest share of direct emissions related to municipal waste management. The benefits of incineration and recycling are expected to increase throughout the period.

Greenhouse gas emissions from landfill are caused by the breakdown of organic wastes accumulated over the past decades. In the model, however, the impacts of landfilling are calculated over a 100-year period, with the total impact over this period being attributed to the year in which the waste is deposited (Gibbs *et al.*, 2014b). Therefore, the positive effect of diverting BMW from landfills can be immediately observed in the results as reduced emissions from landfilling. In Finland, according to the model, towards 2020 nearly similar shares of the direct emissions of waste management will originate from incineration and landfilling.

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, to the following issues:

- the extent of packaging waste from households and similar packaging from other sources are included in or excluded from reports of the MSW recycling;
- 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.

Definitions of municipal waste in Finland follow EU principles. Finland, however, includes about 54 000 tonnes of home composting and a small amount of waste incinerated in households. For packaging waste, the MSW data include all packaging waste, but all packaging waste from the industrial and the energy sectors are then deducted. As a result, the Finnish MSW data include packaging waste from the commercial, service and retail sectors. (Gibbs *et al.*, 2014a)

As the Finnish municipal waste strategy is based on the source separation of wastes, most organic waste is composted or anaerobically digested and MBT, as such, is not applied. Uncertainty about MBT is, therefore, not relevant to Finland.

2.3 Important initiatives taken to improve MSW management

As in many other countries, the Finnish municipalities are responsible for collection and treatment of household waste. Finland has many municipalities, including many small ones, and it is, therefore, an advantage that many municipalities have organised the management of waste through regional waste organisations. This has improved the infrastructure over the last 15–20 years (ETC/RWM, 2008).

Finland has achieved very good results in those instances where waste streams have clear targets and divisions of responsibility, such as for tyres and paper. Another example of clearly formulated targets and responsibilities is the fulfilment of the technical requirements for landfills; Finnish landfills met the requirements of the EU Landfill Directive by the end of 2007 – two years ahead of the deadline (ETC/RWM, 2008). Furthermore, Finland has been successful in meeting the diversion targets for BMW from landfills, mainly due to the increase in incineration capacity.

In 2008, the government approved a new national waste plan running until 2016 that includes a 50 % recycling target for MSW, with 30 % target for energy recovery and a maximum of 20 % to be sent to landfill (Finland, 2009). The 50 % recycling target is broken down into targets for material recycling of 30 %; composting at source, 6 %; and composting or anaerobic digestion in biogas plants, 14 % (Finland, 2009). This nationwide strategic plan includes goals and objectives for waste management and waste prevention. For each goal and objective, the necessary policy instruments have been proposed and an implementing body identified (ETC/SCP, 2012a). The 50 % recycling target for MSW by 2016 was also included in the Decree on Waste 179/2012.

Progress towards the National Waste Plan targets was reviewed in two interim evaluations, in 2012 and 2014. The first evaluation report identified the most important measures to improve recycling rates as the binding obligation for the different waste management actors to follow the waste hierarchy imposed in the Waste Act (646/2011), and ambitious recycling targets (Finnish Ministry of Environment, 2012).

By the time of the second evaluation report (Finnish Ministry of Environment, 2014) it was obvious that developments in recycling were not sufficient for the country to meet the 50 % recycling target for MSW by 2016. Recycling innovations were seen as essential to improving recycling rates and were proposed to be one of the focal points of the next National Waste Plan. Important policy initiatives for increasing recycling included a landfill ban for the disposal of organic waste, from 1 January 2016, and the new obligations included in the new Government Decree on Packaging and Packaging waste (518/2014). Furthermore, the MoE funded 13 projects promoting recycling and this will continue for projects with a focus on piloting and demonstration. Several new economic

instruments to support anaerobic digestion have also been adopted. These incentives increased the number of new biogas facilities (Finland, 2012).

According to the Government Decree on Packaging and Packaging waste (518/2014), producers must arrange the separate collection and recycling of packaging waste so that the following minimum recycling rates are met ⁽²⁾:

- fibre packaging waste (paper and cardboard) 80 % by 2016;
- wood packaging waste 17 % by 2016;
- glass packaging waste 27 % by 2016 and 40 % by 2020;
- metal packaging waste 75 % by 2016 and 80 % by 2020;
- plastic packaging waste 16 % by 2016 and 22 % by 2020.

The Decree also contains minimum requirements for the service level and accessibility of separate collection services to be arranged by the producers. From 1 January 2016 the network of collection points for household packaging waste was to expand to a minimum of 1 850 collection points for cardboard, glass and metal packaging waste throughout Finland. In addition, plastic packaging waste was to be collected at 500 points. The system is run and maintained by Finnish Packaging Recycling RINKI Ltd, a non-profit service company established in 1997 and owned by several associations within the Finnish industry and retail trade sector. (RINKI Ltd., 2015)

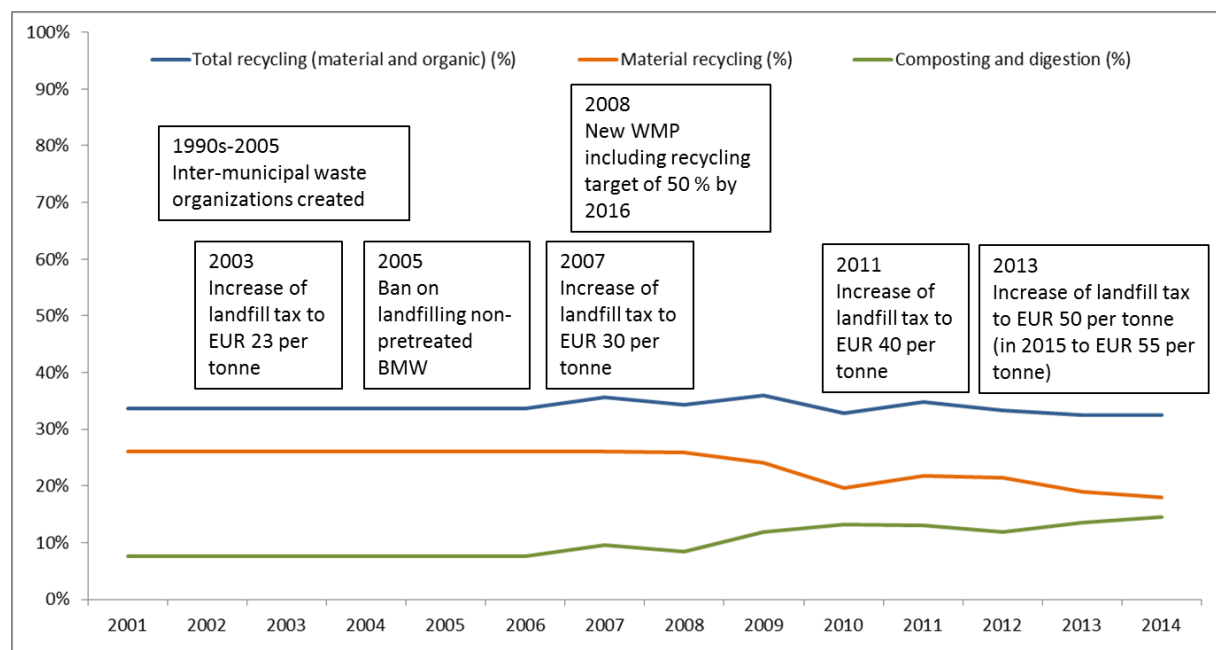
A partial landfill ban on BMW was introduced in the late 1990s and in 2005 a landfill ban on non-pre-treated BMW was introduced (ETC/RWM, 2008 and ETC/SCP, 2012a). This initiative contributed to achieving the EU Landfill Directive targets for reduction of BMW by 2006 and 2009. A landfill ban on organic waste came into force in 2016 (Government Decree on Landfills 331/2013). The ban concerns waste that contains more than 10 % of organic substances, measured as total organic carbon or loss on ignition.

Finland introduced a landfill tax in the late 1990s, and there have been several increases in it. The rate since 1 January 2015 has been EUR 55 per tonne, but this was further increased in 2016 to EUR 70 per tonne (amendment 1401/2015 to the Waste Tax Act).

It appears that Finnish policy has favoured MSW incineration, for example, there is no tax on incineration of MSW. This implies that the increases in landfill tax might encourage more incineration rather than recycling. New initiatives are planned by the MoE to find ways of enhancing recycling.

⁽²⁾ These recycling-rate requirements do not include beverage packaging included in the deposit refund system for which separate recycling targets have been set.

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



2.4 Possible future trends

Finland does not fulfil the criteria of Article 11 (3) of the WFD to get a derogation period for fulfilling the 2020 target of 50 % recycling of MSW. If Finland is to fulfil this EU recycling target, it will have to speed up its efforts and achieve an average 2.9 percentage points per year increase between 2014 and 2020. To meet the target a significant effort from the Finnish government, the local authorities is needed, as well good co-operation between the public and private sectors.

If Finland is to fulfil its own target of 50 % recycling by 2016 as stated in the National Waste Management Plan (Finland, 2009), an increase per year of at least 5.7 percentage points in recycling will be required. It seems especially that the increase of recycling has to be undertaken for material recycling, which has decreased in the latest years. In 2013, the recycling of materials covered only 19 % of the total MSW generated and the Finnish national target here is 30 %. In the last five years the organic recycling rate increased with five percentage points and reached a level of 13.5 %. The target is to reach 20 % by 2016.

The Finnish waste plan estimates that 700 000-750 000 tonnes of incineration capacity for MSW are needed by 2016 (Finland, 2009). Over 1.1 million tonnes of MSW was incinerated in 2013. It seems that Finland is at risk to build overcapacities for incineration that might be an obstacle for increasing the recycling rate. In order to meet the 50 % recycling target, incentives to increase recycling have to be considered.

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