Country fact sheet

Municipal waste management

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Cyprus

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European Topic Centre on Waste and
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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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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

- Cyprus generates high volumes of municipal solid waste (MSW) – 617 kilograms per person in 2014.
- Recycling in Cyprus is at a relatively low/medium level, but it has been increasing steadily. The amount of MSW recycled increased 6-fold between 2001 and 2014, from around 3 % of the amount generated to 18 %. This can be mainly attributed to the implementation of mechanical biological treatment (MBT).
- Trends suggest that Cyprus will have to make an extraordinary effort to fulfil the 50% recycling target of the EU's Waste Framework Directive by 2020 and its obligations under the Landfill Directive.

1 Introduction

1.1 Objective

Based on historical municipal solid waste (MSW) data for Cyprus and EU targets linked to MSW in the Waste Framework Directive, 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 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 Cyprus' municipal solid waste management performance

Cyprus is a relatively small country, with a population of 858 000 (2014) and land area of 9 251 square kilometres. Municipal solid waste generation, however, is amongst the highest in the EU at 617 kilograms per person in 2014, well above the EU average. The main aim of the authorities in Cyprus is to reduce this high generation rate, which peaked in 2009 and declined since. In general, generation rates are based on socioeconomic drivers (EEA, 2015), but the country's considerable tourist industry also contributes (Table 2.0).

Table 2.0 Cyprus, total number of nights spent by non-residents in hotels and similar establishments, 2001–2014

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Million nights spent in Cyprus	18.1	15.2	13.4	13.6	13.9	13.2	13.1	13.2	11.5	12.3	12.9	13.5	13.1	13.1

Source: Eurostat, 2015

In Cyprus the formal waste collection system for households covers mixed municipal (residual) waste and three source separated fractions of recyclables: paper and card, glass, and plastic, metal and beverage cartons. Households either place their waste in bags for doorstep collection or use large street waste containers (bring sites). Currently 65 % of households in Cyprus are serviced by a door-to-door collection and 14 % by a bring system. Around 22 % of households are not covered by the formal collection of packaging waste (Gibbs *et al.*, 2014a). As reported to Eurostat in 2001–2014, 93–100 % of the generated MSW in Cyprus was sent to final treatment operations (Eurostat, 2016).

The waste management system in Cyprus is constrained by a lack of appropriate treatment facilities for MSW and hazardous waste. As a result, the overriding option is landfilling, which accounts for 79 % of generated MSW. There are currently four landfill sites operating, of which two comply with the provisions of the Landfill Directive (Statistical Service of Cyprus, 2014).

Recyclables are mainly sorted manually in Cyprus, sorted glass packaging used as an input in the production of cement industry. Other recyclables are exported for further processing and recovery, and

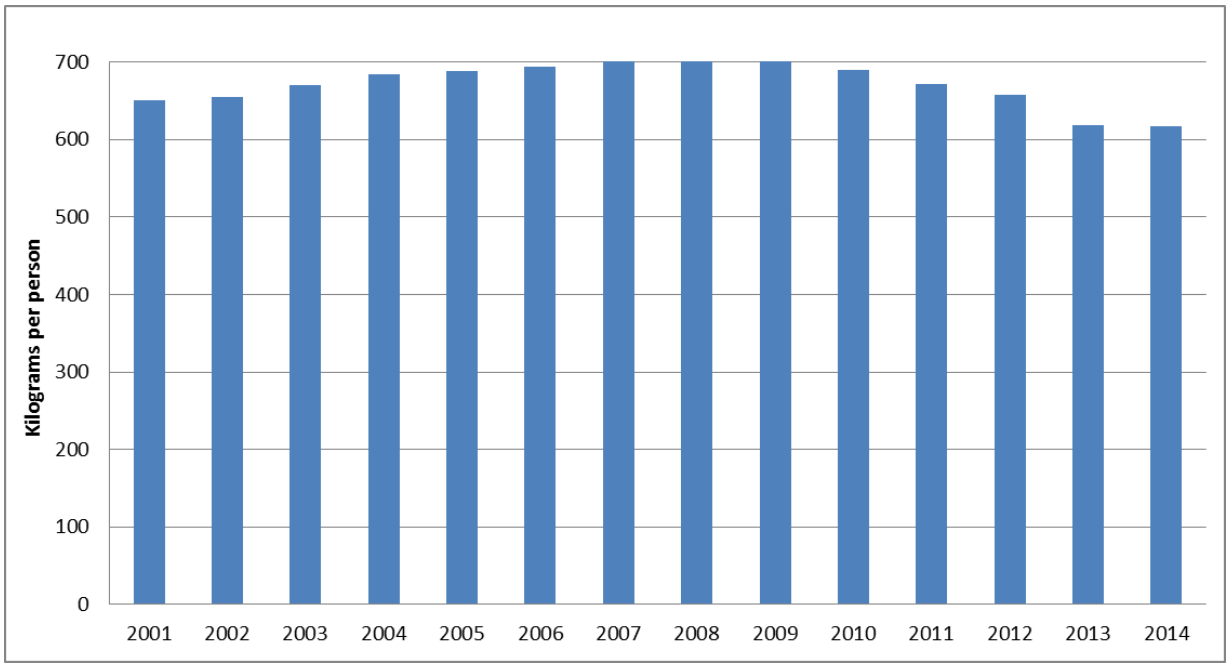
sorting rejects landfilled. A mechanical biological treatment (MBT) plant servicing the Larnaca and Famagusta districts started operation in 2010 and mechanically sorts glass, metal, plastics and paper as well as composting bio-waste. The plant, with a maximum capacity of 160 000 tonnes per year, receives mixed MSW from which packaging waste has been removed. The treatment rejects are landfilled. There are currently no incineration facilities in Cyprus. (Gibbs *et al.*, 2014a; Statistical Service of Cyprus, 2014)

2.1 Municipal solid waste indicators

The following indicators illustrate the development of MSW management in Cyprus between 2001 and 2014. All percentages have been calculated by relating the waste managed to the generated amount rather than the treated amount. Relating them to the total managed amount of MSW would generally result in higher rates for all waste management paths.

Figure 2.0 shows the development of MSW generation per person in Cyprus from 2001 to 2014. There was a slow but gradual increase from 650 to 729 kilograms per person between 2001 and 2009, after which quantities declined to 617 kilograms per person in 2014 (Eurostat, 2016). Nonetheless, MSW generation per person remains well above the 2014 EU average of 474 kilograms per person.

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



Source: Eurostat, 2016

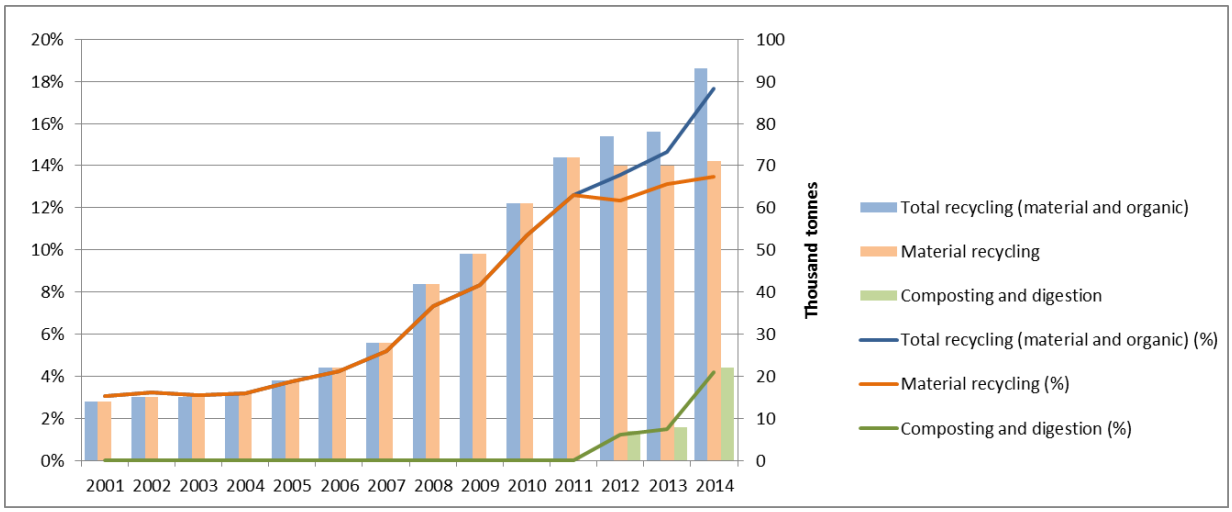
2.1.1 Municipal solid waste recycling, 2001–2014

Figure 2.1 shows the development of recycling of MSW in Cyprus related to total recycling, material recycling and organic recycling – composting and other biological treatment. As can be seen, the amount recycled as a percentage of generated MSW increased from around 3 % in 20001 to 18 % in 2014.

The recycling of organic waste started in 2012, since when the increase in material recycling has levelled off. The increase in recycling rates can be at least partly attributed to the MBT plant which started operation in 2010.

In general, recycling in Cyprus is at a relatively low/medium level, but a significant increase can be observed in the last three reporting years.

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



Source: Eurostat, 2016.

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 to calculate compliance with the target[1]. Cyprus has chosen calculation method 2 (Gibbs *et al.*, 2014a) and has reported a recycling rate of 22.4 %. The recycling rates shown in this paper, however, correspond to method 4, the only one 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 (EC, 2015b).

2.1.2 Landfill of biodegradable municipal waste

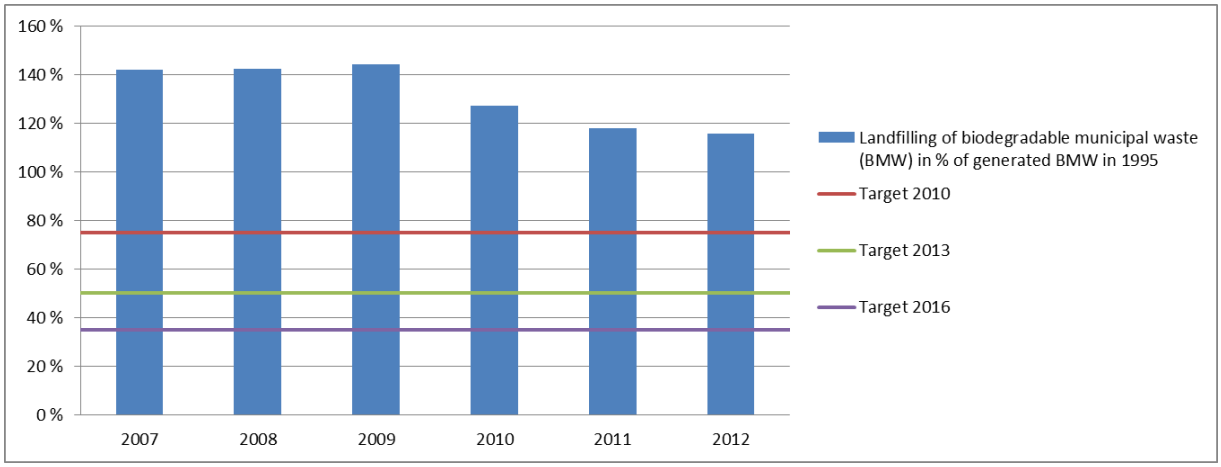
According to the EU Landfill Directive, Member States have to reduce the amount of biodegradable municipal waste (BMW) landfilled by specific targets for 2006, 2009 and 2016. Cyprus, however, has been given a four-year derogation period for the 2006 and 2009 targets and thus has to meet the targets by 2010, 2013 and 2016. The targets are related to amount of BMW generated in 1995, when Cyprus generated 262 000 tonnes. Cyprus has reported the landfilled amount of BMW to the European Commission for the years 2007–2012 (EC, 2014; EC, forthcoming).

[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).

Cyprus is landfilling a lot more biodegradable waste than it generated in 1995 (Figure 2.2). This is caused not only by the fact that landfilling is still the dominant treatment path, but also by the large increase in BMW generation since 1995. The landfilled quantity increased until 2009 but has declined since, thanks to the establishment of organic waste recycling. Nevertheless, Cyprus did not fulfil its first target for 2010 and will need to make an exceptional effort if it is to achieve the 2013 and 2020 targets. The fact, however, that organic recycling has begun shows a clear way for Cyprus to improve.

Figure 2.2 Cyprus, landfilling of biodegradable municipal waste, 2007–2012, per cent of biodegradable municipal waste generated in 1995



Source: EC, forthcoming (data for 2009–2012); EC, 2014 (data for 2007 and 2008)
Note: The target dates take into account Cyprus' four-year derogation period for the first two targets.

2.1.3 Recycling and landfill taxes

According to Gibbs *et al*. (2014a) there is a low landfill tax of EUR5–10 per tonne for Limassol and Nicosia. Waste management in Cyprus is funded by the general taxes paid by the citizens. For packaging waste the funds are raised by the Green Dot Packaging system, through which producers are charged according to amounts of packaging materials they place on the market each year. (Gibbs *et al.*, 2014a)

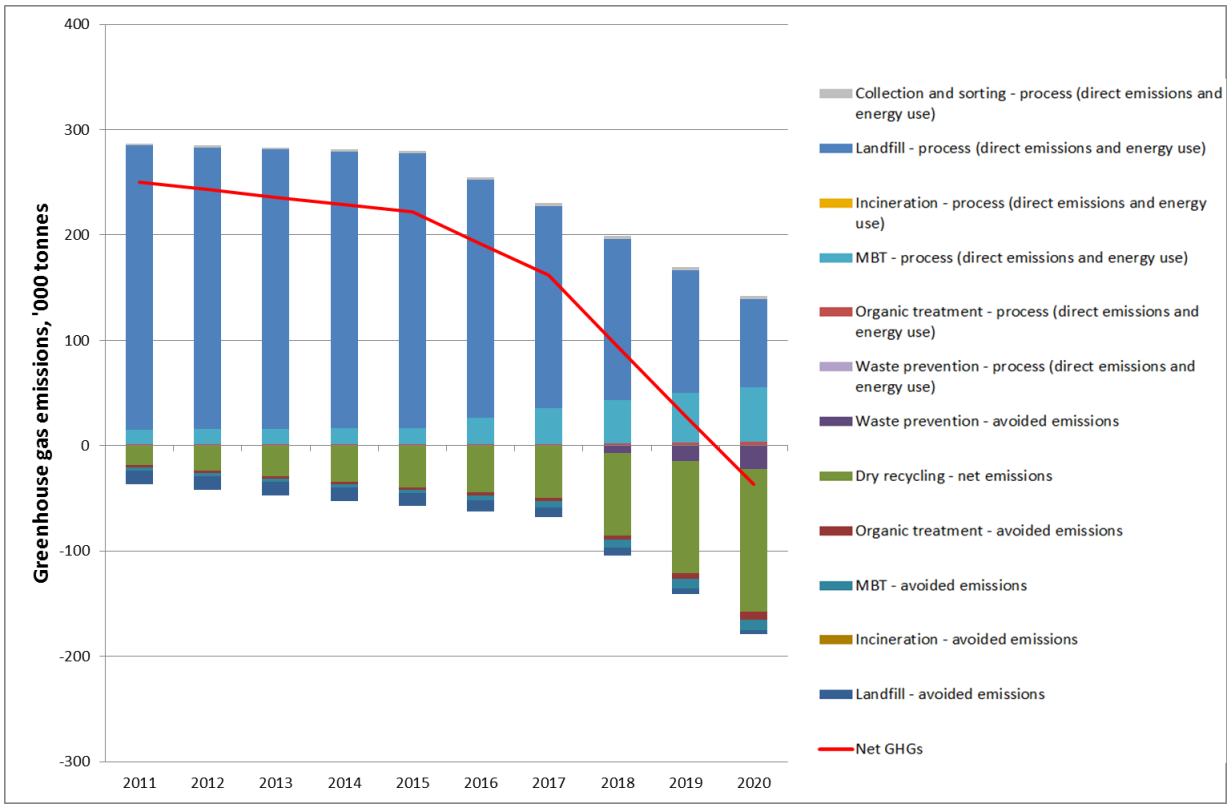
2.1.4 Environmental benefits of better municipal solid waste management

Figure 2.3 shows a scenario for the development of greenhouse gas emissions from MSW management in Cyprus. The scenario assumes an annual increase of 1.2 % in municipal waste generation for the years 2011–2015, of 0.7 % for 2015–2019 and 0.3 % per year for 2019–2020. The scenario also assumes that the EU targets for municipal waste are fully met. 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 2.3 shows the direct emissions, those avoided and the net emissions 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; MBT and related technologies; collection and sorting; incineration and landfill.

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 the bio-treatment of food and garden waste from MSW. The modelled scenario assumes full implementation of existing EU targets on municipal waste management (Gibbs *et al.*, 2014c). The applied methodology means that net GHG emissions can become negative. That does, however, not mean that more waste is good for the environment. The reason is that the model does not include all the GHG emissions during production of the products that end up as MSW.

Figure 2.3 Cyprus, 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 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 Cyprus are expected to decrease in the period 2011–2020 and arrive at a small net saving by 2020, when the benefits of better waste management are expected to be higher than the direct emissions from collection and treatment operations. In the first modelled years of the scenario, the direct greenhouse gas emissions from municipal waste management are almost exclusively caused by landfilling, while the benefits of recycling are relatively low.

Greenhouse gas emissions from landfills are caused by the breakdown of organic wastes deposited in landfills in the past. In the model, the landfill impacts 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. According to the model, the direct greenhouse gas emissions from waste management in Cyprus will increasingly originate from MBT operations.

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.

Cyprus includes packaging waste from households in its reporting of MSW, and a distinction is made between packaging waste from municipal and other sources.

The collection for MSW statistics in Cyprus has, since 2002, been carried out by a survey of municipalities. The data gathered is partly based on the weighing of waste trucks and partly on estimates. In the recent years, the amount and origin of waste entering two new landfill sites – the Paphos and the Larnaca-Famagusta landfills – has been recorded on a daily basis since 2006 and 2010 respectively. These data complement with the survey data (Statistical Service of Cyprus, 2014).

For recyclables, the amounts reported by Cyprus are the amounts collected. The collected packaging waste, except glass, is exported for recovery. A share of collected recyclables can be temporarily stored in the country for future export (Statistical Service of Cyprus, 2014).

In the Larnaca-Famagusta MBT plant the organic waste sent to composting after the mechanical sorting process is reported as composted. The share of compost produced is estimated at about 21 % of the input, while around 50 % is water lost during the process. Rejects are sent to landfill where the waste is recorded as landfilled, causing double counting of this waste stream (Statistical Service of Cyprus, 2014).

2.3 Important initiatives for improving municipal waste management

Cyprus has integrated the EU Directives related to waste in the national legislation. A National Strategic Solid Waste Management Plan has existed since 2002, which reflects the legislative targets, based on the Landfill Directive, and introduces a framework of standards for MSW management. The most recent waste management plan was published in 2004. A revised plan, the Management Plan for Domestic and Similar Type Wastes was completed in 2012 but is still in consultation. The National Waste Prevention Programme was adopted in October 2015 (MoE, 2015).

The draft Waste Management Plan includes the following strategies (BiPro and CRI, 2015):

- Utilization of waste as resources for the promotion of separate collection;
- Develop new and strengthen existing collection systems, especially to promote the separate collection of recyclables from households;
- In order to meet the WFD recycling target of 50 %, the aim is 50% separate collection of total MSW until 2020. The promotion of separate collection shall be achieved through a combination of legislative and techno-economic assistance to Local Authorities and/or the producers of large amounts of waste;

- Promotion of PAYT schemes;

- Co-financing of measures promoting the implementation of separate collection, development and implementation of public awareness raising programmes.

The 2004 waste management plan had the following specific targets for packaging waste (Arcadis, 2014):

- by 31 December 2012, the recovery of at least 60% of the total weight, and recycling of at least 55 %;
- by 2016, the recovery of at least 75 % of the total weight, and recycling of at least 65 %.

The required percentage recycling rates are also detailed, for example up to 2016:

- 60 % by weight for glass;
- 90 % by weight for paper and card;
- 90 % by weight for metals;
- 30 % by weight for plastics;
- 15 % by weight of wood.

Existing legislation for Cyprus includes:

- Solid and Hazardous Waste Law (2002): aims to, among other issues relevant to MSW, reduce waste quantities and environmental impacts; establish an integrated and optimised national waste management system that allows Cyprus to manage its wastes; standardise and monitor all operations within the waste management system; establish a waste management strategy including treatment options and targets for waste management, with a special focus on biodegradable and packaging waste; introduce the polluter-pays principle; regulate the transboundary movement of waste; organise the public administration of the waste management system; and adopt the Eurostat nomenclature.

- Waste Law (2011): aims to integrate the EU Directives, including the Landfill Directive and the WFD.

According to the analysed information, it seems that Cyprus does not use any of the stronger policy instruments used in other countries to reduce the landfilling of biodegradable municipal waste and to enhance the recycling of MSW, such as landfill bans, the introduction of mandatory separate collection, or economic incentives for households to recycle or reduce waste. Furthermore, the landfill taxes, where implemented, are very low. Although the separate collection of waste is in place, this can only deliver limited amounts of recyclable materials.

The recycling sector in Cyprus is based on private initiatives. The Green Dot Cyprus, a not-for-profit company set up in 2006, is the only recycler that organizes collection in the country, and, very recently, an advanced Material Recovery Facility for sorting mixed waste began operation. The Green Dot Cyprus scheme is estimated to cover around 80 % of collection, recycling and recovery costs for packaging waste (EC, 2012).

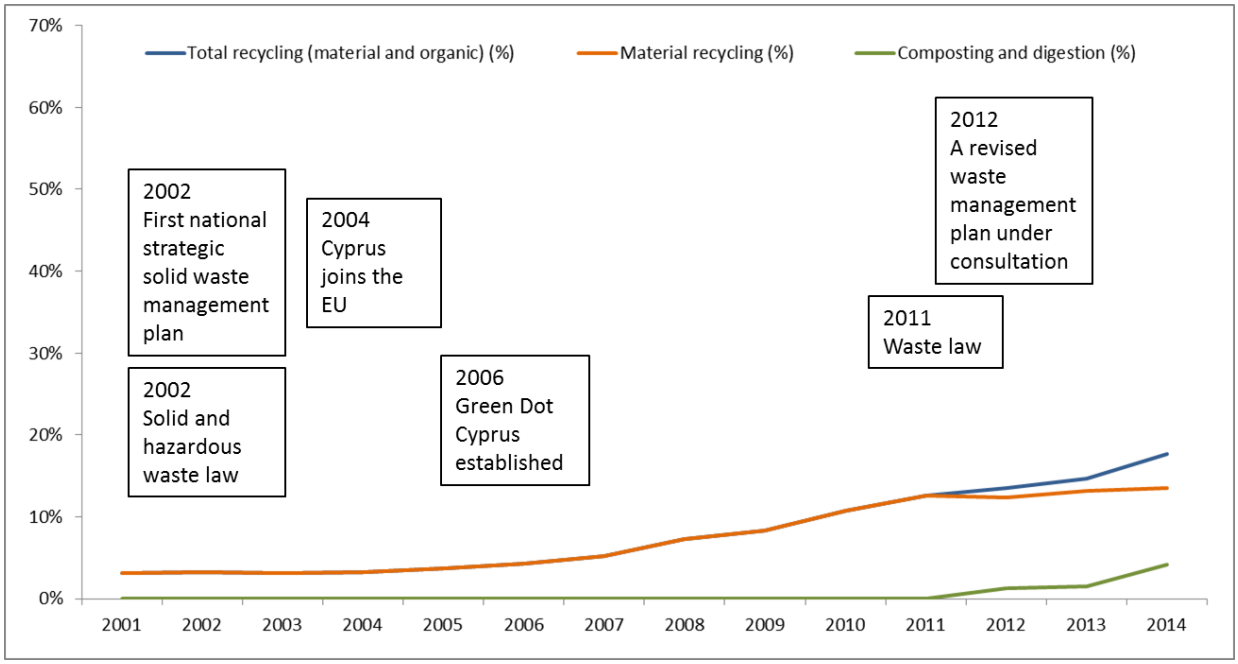
Additional initiatives to help to achieve the recycling targets set by EU legislation include (Gibbs *et al.*, 2014a):

- pilot programmes for pay-as-you-throw and separate collection of organic waste;

- landfill tax in Paphos and Larnaca/Famagusta;

- restriction of landfilling of certain types of waste, including recyclable, green, hazardous, and construction and demolition wastes.

Figure 2.4 Cyprus; recycling of municipal solid waste, per cent, and important policy initiatives, 2001–2014



2.4 Possible future trends

Cyprus has identified the very high level of MSW generation as one of the most important issues. This cannot be explained solely by the correlation of MSW generation to gross domestic product (GDP), and tourist activities could also be partly responsible (EEA, 2015).

The Ministry of Environment in Cyprus has provided future MSW projections up to 2040. It is estimated that MSW generation will rise until 2030, by about 10 % relative to 2012, and then begin to decline in the late 2030's (Gibbs *et al.*, 2014a).

Cyprus will need to further intensify its MSW recycling efforts if it is to meet the 50 % recycling target by 2020. Currently, Cyprus is attempting to improve MSW management and recycling by developing three further MBT plants – integrated waste management facilities in Limassol, Nicosia and Paphos. The maximum combined capacity of the three plants will be 410 000 tonnes a year, and they were expected to start operation in 2015–2016. The outputs of the plants will be recyclables and refuse-derived fuel. The utilisation route for this fuel is still in development but it could be used either for the cement industry, or in energy production, or it could be exported. (Gibbs *et al.*, 2014a)

Only a small proportion of the organic waste is currently source separated in Cyprus. There are preliminary plans to enhance the separate collection of organic waste, as well as other waste types, by the expansion of door-to-door collections. In addition, the implementation of civic amenity sites, Green Points, for such source-separated municipal waste as paper, glass, garden cuttings and furniture has been proposed in the draft waste management plan (Arcadis, 2014; Gibbs *et al.*, 2104)

There are plans to build new composting plants for the treatment of organic waste, and to expand the capacity of existing digestion plants which currently accept only manure and industrial waste (Gibbs *et al.*, 2104).

In addition to the WFD recycling target, another incentive for Cyprus to increase recycling, and specifically composting, is the implementation of the Landfill Directive. As Figure 2.2 shows, Cyprus will need to make an exceptional effort to fulfil the three Landfill Directive targets.

In general, although Cyprus has integrated all EU legislation, it faces difficulties in its implementation, mainly due to a lack of infrastructure and collection systems to divert biodegradable waste from disposal, a lack of coordination between different administrative levels and lack of capacity at local level, inefficient Extended producer responsibility schemes, and more generally a lack of incentives to prevent and recycle. (EC, 2016)

It becomes clear there is a need to invest in municipal waste recycling in the coming years in order to reach the recycling target of 50% by 2020. Especially separate collection and facilities are needed for recycling and composting. Improvements can be expected in 2016, since the planned initiatives (development of treatment facility in Limassol, implementation of selective collection for paper and organic waste) should have been completed in 2016. (EC, 2016)

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