

Municipal waste management in Poland



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Context

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Disclaimer

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Highlights

Key developments in municipal waste management in Poland between 2001 and 2010

- Recycling has increased from 5 % of MSW generated in 2004 to 21 % in 2010;
- The increase is first of all linked to material recycling, whereas increase of organic recycling has only taken place in 2009 and 2010;
- Poland only includes recycling of packaging waste from households to a limited extent in its reporting of MSW recycling;
- An extraordinary effort will be required to meet the EU requirement on 50 % MSW recycling in 2020;
- It appears that the 2010 target for biodegradable municipal waste sent to landfill has not been met in 2010;
- An increased landfill tax has been an important policy initiative in diverting MSW away from landfills; and
- In 2011, larger responsibility for collection and MSW management has been given to the municipalities, which can give better possibilities for improving the level of MSW recycling.

1 Introduction

1.1 Objective

Based on historical MSW data for Poland and EU targets linked to MSW, the analysis undertaken includes:

- The historical performance of MSW management based on a set of indicators,
- Uncertainties which may offer an explanation for the varying levels of performance between countries- for example, this could have more to do with inconsistent standards of reporting rather than the quality of management.
- Relation of the indicators to the most important initiatives taken to improve MSW management in the country, and
- Assessment of the possible future trends and the achieving of EU targets on MSW to be achieved by 2020.

2 Poland's MSW management performance

Poland had been preparing itself to fulfil EU waste requirements for several years before it entered the EU in 2004. The first Polish law concerning waste management was enacted in June 1997, and came into force on 1 January 1998. Another important act about keeping cleanliness and order in municipalities was passed in September 1996 and came into force on 1 January 1997.

On 1 October 2001, a new Act from April 2001 came into force which introduced the waste hierarchy, the proximity principle and the principle of extended producer responsibility as its basis, along with new requirements for waste generators and actors involved in waste management activities (Tojo, N., 2008). In 2002, the first national waste management plan was approved for the years 2002-2006. The second plan which covered 2007-2010 was approved in 2006 (Poland, 2006), and the third plan covering 2011-2014 was approved in 2010 (Poland, 2010).

2.1 MSW Indicators

In 2007, generation of MSW in Poland exceeded 12.3 million tonnes before decreasing to 12 million tonnes in 2010 (Eurostat, 2012). In contrast to many other countries the reported generation of MSW in Poland declined from 12.2 million tonnes in 2000 to 9.8 million tonnes in 2004.

However, this decrease is not an accurate reflection of what has happened in real terms, but a number of other factors have been identified: 1) a lack of weighing of the waste received at landfills as only 1/3 of the landfills had sufficient weighing equipment, 2) a failure of a number of real estate owners to conclude contracts with the relevant company responsible for collection of wastes, and who discarded their wastes on illegal waste dumps or utilised the waste in their own household, 3) a failure of the municipal authorities to enforce compliance with the permit conditions in the scope of municipal waste collection from the real estate

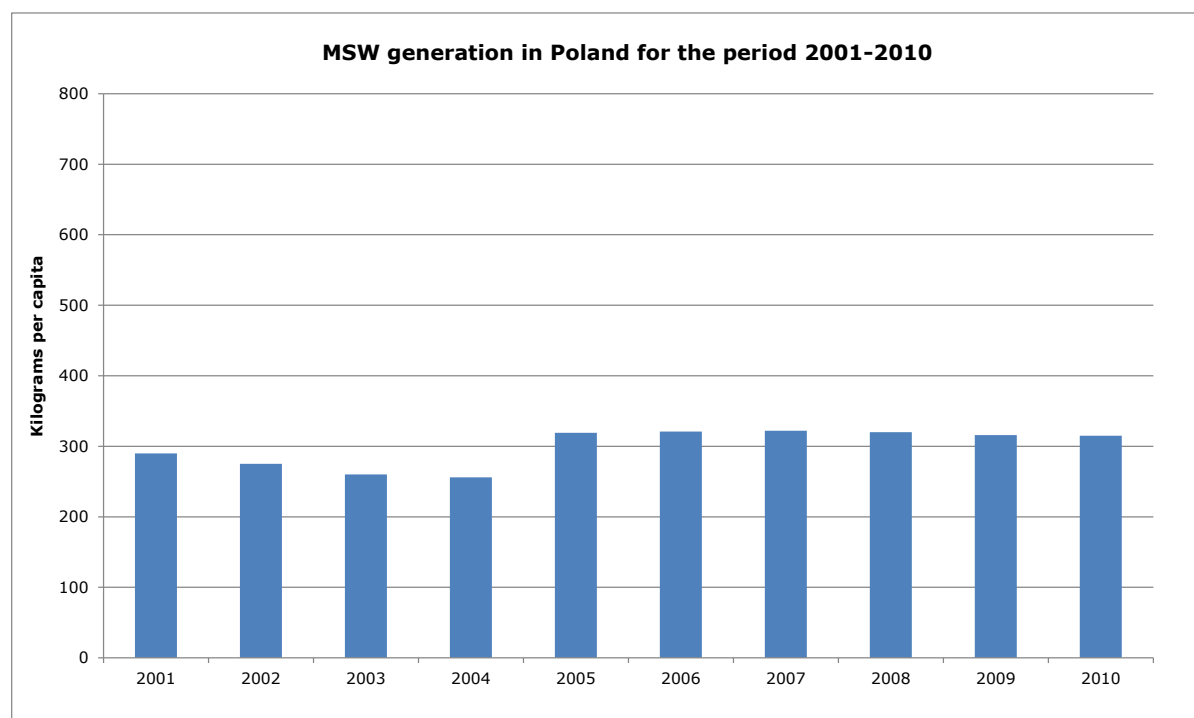
owners, and 4) a decline in the weight per volume (i.e. a rise in the volume of waste with a lower unit weight) (Poland, 2006).

In addition, the amounts until 2005 only cover the collected MSW (Eurostat metadata, 2010), whereas the amounts from 2005 to 2010 include both the collected amounts and an assessment of the generated amount that is not collected. This is relevant as only 78 % of the population was covered by organised collection schemes in 2008 (Poland, 2010).

Figure 2.0 shows the development of MSW generation per capita in Poland from 2001 to 2010. There has been a decrease from 290 kg in 2001 to 256 kg in 2004. From 2004 to 2005 there was an increase from 256 kg per capita to 319 kg, which can be explained by the above mentioned change in the registration methodology. From 2005 to 2010 the generation has been quite stable.

The majority of MSW in Poland is still landfilled. In 2010, the figure was 7.4 million tonnes compared with 10.6 million tonnes in 2001, and 9.2 million tonnes in 2004. In 2010, the generated amount of MSW was 12 million tonnes but the information available only covered the management of 10 million tonnes. There is no conclusive information on the remaining 2 million tonnes but it can be assumed that at least part of it has been illegally dumped or has been used by households for their own purposes, such as home-composting, feed for animals or fuel.

Figure 2.0 MSW generation per capita in Poland



Source: Eurostat, 2012

Some indicators regarding the development of MSW management are shown below. All percentage figures after 2004 have been calculated by relating the waste management to the generated amount - not to the managed amount. As a general rule this underestimates the actual level of landfilling, incineration and recycling.

2.1.1 The recycling of MSW from 2001 to 2010

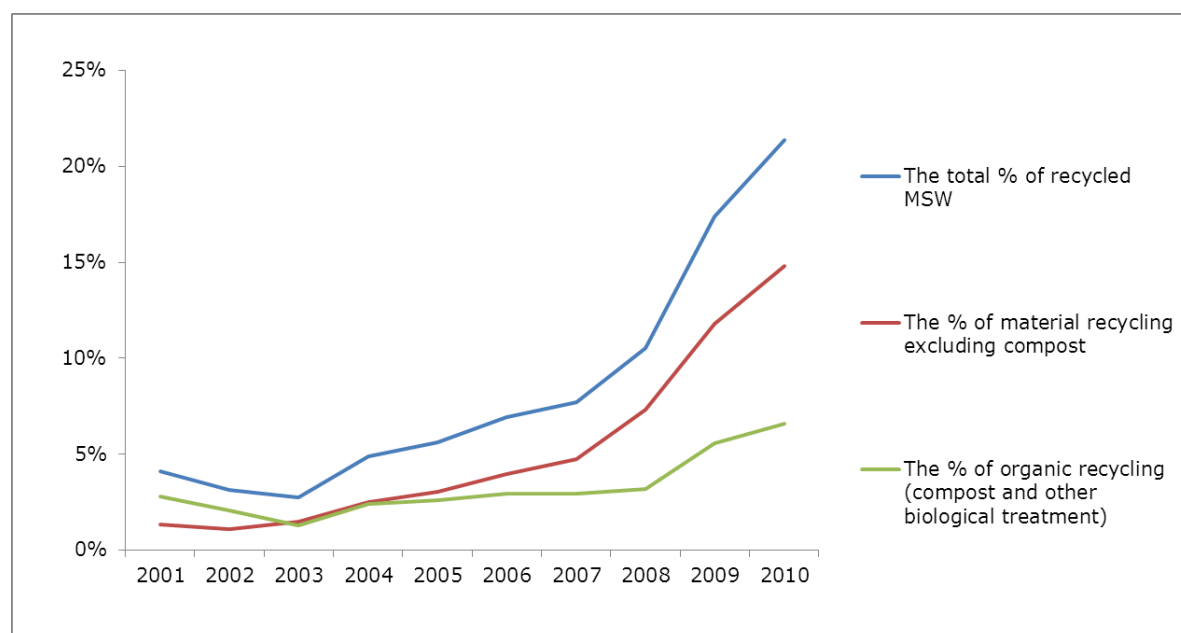
Figure 2.1 shows the development of recycling of MSW in Poland related to total recycling, material recycling and organic recycling (compost and other biological treatment). Figure 2.1 illustrates a positive trend in the recycling of MSW after 2003. The total recycling increased from 5 % in 2004 to 21 % in 2010.

The percentage increase of recycling is in fact larger than stated. 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.

The total increase of recycling is first of all linked to material recycling which has increased from 2 % in 2004 to 15 % in 2010 - or in absolute amounts from 240 000 tonnes to 1 780 000 tonnes.

Organic recycling has only increased from 2 % to 7 % in the same period equivalent to an increase from 230 000 tonnes to 790 000 tonnes. This increase in organic recycling has first of all taken place within the last two years (2009 and 2010).

Figure 2.1 Recycling of MSW in Poland



Source: Eurostat, 2012. The percentages are calculated as % of generated MSW in the period 2005-2010, and as % of collected MSW in the period 2001-2004.

The composition of the material recycling is shown in Table 2.1. Although there has been some increase in the amount of separately collected recyclables (especially glass and plastic wastes and separately collected bio-waste), the largest increase is linked to recyclables from the sorting of mixed municipal waste and mixed municipal waste receiving biological treatment. There is no information available on what precisely is contained in these recyclables. In that way, the table indicates that there is a large need for increasing separate collection of wastes as this generally renders better quality recyclables.

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

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

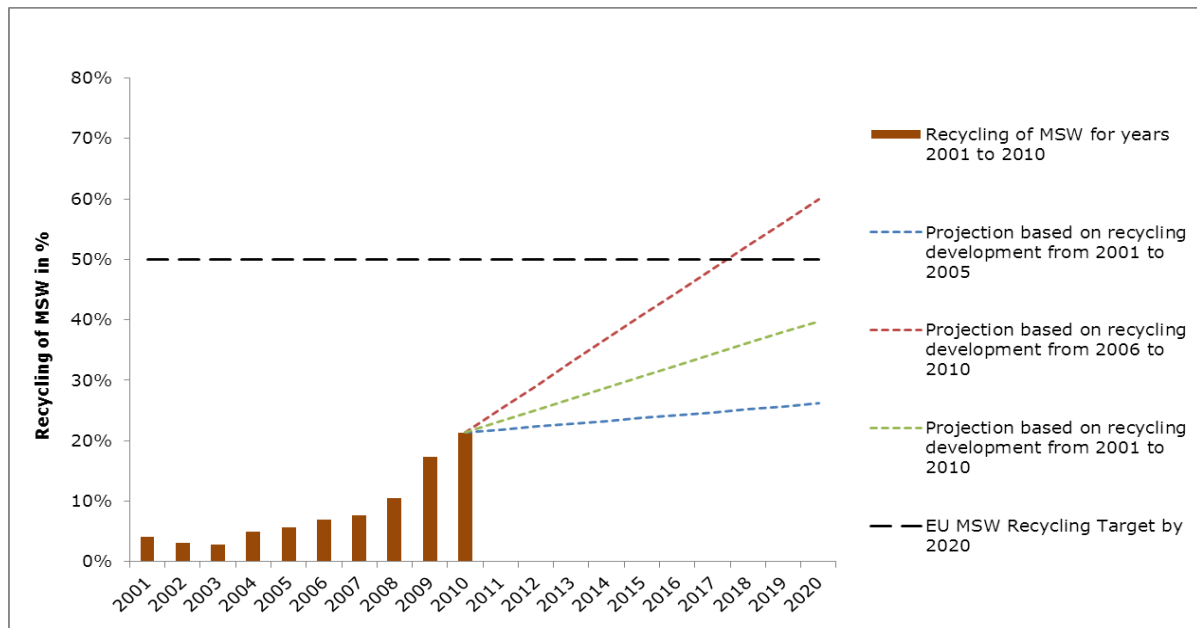
Source: (Poland, 2009 and Poland, 2011)

2.1.2 The yearly increase rate of recycling of MSW

In order to assess the prospects for Poland to meet the 50 % recycling target as required by the Waste Framework Directive (2008/98/EC)¹, three scenarios have been calculated. The scenarios assume that recycling in the period 2010 to 2020 develops, based on a linear regression, with the increase rates of recycling in the periods 2001-2005, 2006-2010 and 2001-2010.

Figure 2.2 Future recycling of MSW in Poland

¹ The EU's updated Waste Framework Directive from 2008 (EU, 2008) includes a new 50 % recycling target for waste from households, to be fulfilled by 2020. In 2011, the European Commission decided that countries can choose between four different calculation methods to report compliance with this target. One of these methods is to calculate the recycling rate of MSW as reported to Eurostat (EC, 2011).



Source: Calculation by Copenhagen Resource Institute (CRI), based on Eurostat, 2012. There is a break in the data before and after 2004. 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.

It has to be kept in mind that these three scenarios are very simplistic and do not take into account any planned policy measures. In addition, they are based on one calculation methodology for recycling of municipal waste (MSW recycled/MSW generated, using data reported to Eurostat) whereas countries may choose to use another methodology to calculate compliance with the 50 % recycling target of the Waste Framework Directive. The scenarios in Figure 2.2 should therefore be interpreted only as to give some rough indications and assessment of the risk of missing the target.

Figure 2.2 highlights that Poland would only be able to fulfil its recycling target of 50 % by 2020 in the scenario based on the recycling trend of 2006 to 2010, where Poland managed to increase MSW recycling with on average 3.6 percentage points annually. It will require an extraordinary effort to keep this pace of development in order to reach a 50 % recycling level by 2020.

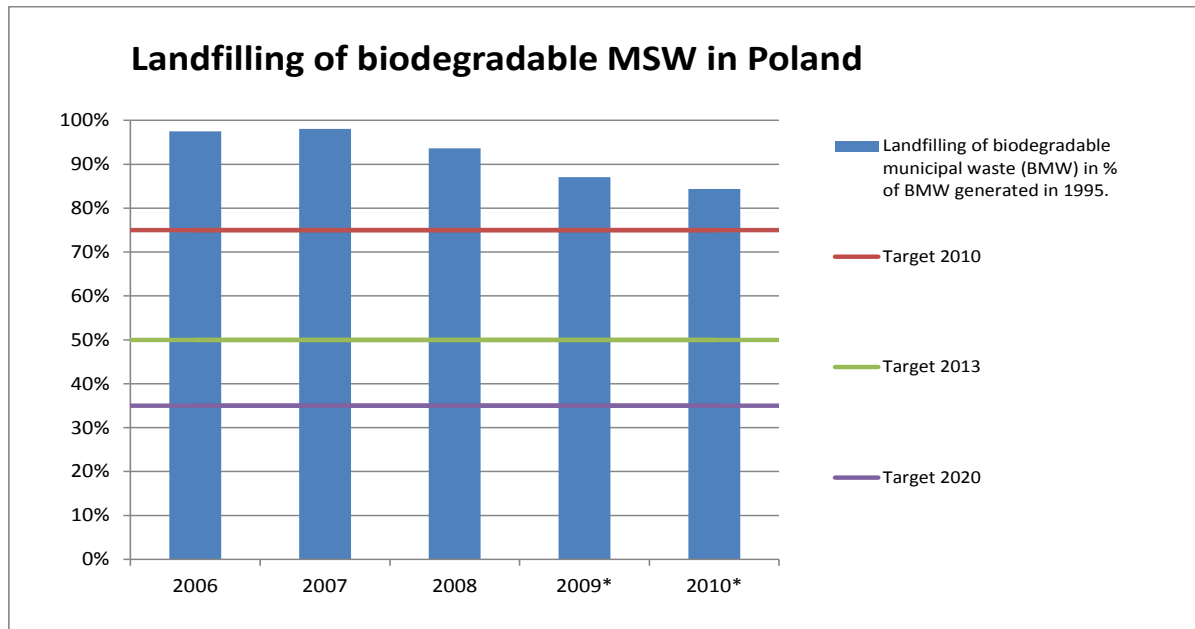
2.1.3 Landfilling of biodegradable municipal waste

It is a general requirement of the EU Landfill Directive that all Member States have to reduce the amount of biodegradable municipal waste landfilled (BMW) by a certain percentage by 2006, 2009 and 2016. However, Poland has been given a four year derogation period. The targets are related to the generated amount of BMW in 1995 (4 380 000 tonnes).

Poland has reported its landfilled amount of BMW to the Commission for the years 2006, 2007 and 2008. In 2008, the landfilled amount was 4 100 000 tonnes (equivalent to 94 % of the generated amount in 1995). Section 2.1.1 of the Polish Waste Management Plan 2014 (Poland, 2010) states that the amount of landfilled BMW fell to 1.69 million tonnes in 2008, but offers no further explanation for this huge reduction from 2007 to 2008.

In Figure 2.3 the amount of landfilled BMW in 2009 has been calculated by subtracting the increase in the amount of MSW going to biological treatment (Eurostat, 2010) in 2008 to 2009 from the amounts of BMW being landfilled in 2008. The amount of landfilled BMW for 2010 has been calculated in a similar way.

Figure 2.3 Landfilling of biodegradable MSW in Poland



Source: EC, 2012 for 2006 - 2008 and CRI estimations for 2009 and 2010* . The target dates take account of Poland's 4 years derogation period.

Figure 2.3 shows little reduction in the percentage (related to BMW generated in 1995) of BMW landfilled in Poland until 2008. One explanation for the missing reduction is that in 2008, the amount of generated BMW has increased from 4.4 million tonnes in 1995 to 6.6 million tonnes (Poland, 2010).

The amount of landfilled BMW decreased 4 percentage points from 2007 to 2008. This development has been estimated to continue from 2008 to 2010, and in 2010 the percentage of landfilled BMW is estimated to be 84 % related to the generated amount in 1995. However, this level is not sufficient to fulfil the 75 % target according to the EU Landfill Directive.

Figure 2.3 also indicates that an extraordinary effort would have to be undertaken if Poland is to fulfil the 50 % and 35 % targets by 2013 and 2020, respectively.

2.1.4 Regional differences of MSW recycling from 2001 to 2010

Poland has also reported regional recycling data of MSW to Eurostat. Figure 2.4 shows regional differences in the development of MSW recycling from 2001 to 2009 in relation to total recycling, material recycling and organic recycling. Three different regions have been chosen for each type of recycling: 1) Recycling in the region with the highest generated total amount of MSW in 2009; 2) Recycling in the region with the lowest percentage of recycling in 2009 and 3) Recycling in the region with the highest percentage of recycling in 2009.

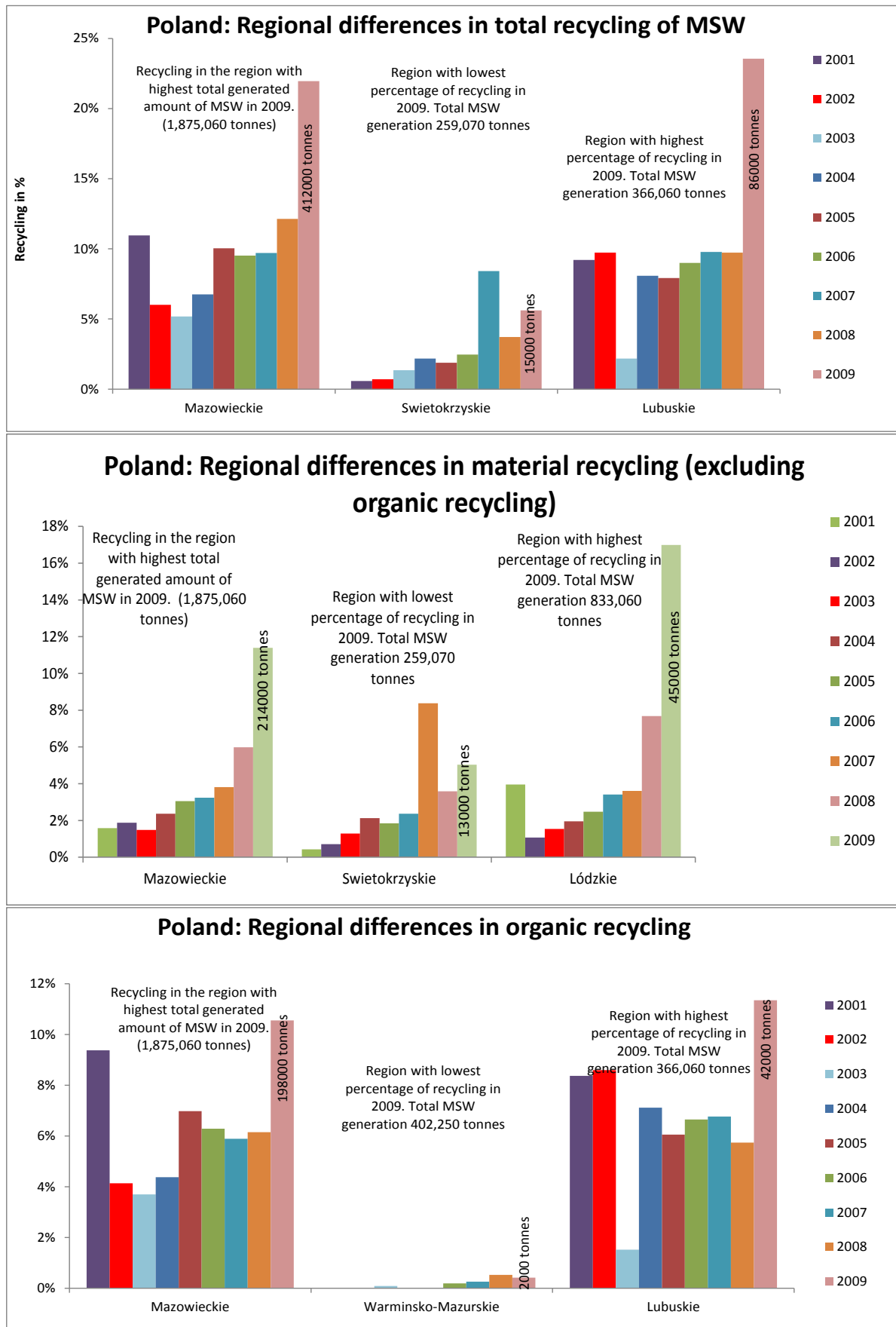
This applies to the regions of Mazowieckie (which covers the capital region), the Swietokrzyskie region (situated in the south eastern part of Poland), the Lubuskie region (situated next to the German border), the Lodz region and the Warminsko-Mazurskie region (both in the north-east of Poland).

In general, it can be said that the data covering these regions highlight some abrupt changes in the years up to 2004. This can be explained by the decrease of collected MSW as previously mentioned (cf. section 2.1). The data appears more stable from 2005. Most of the regions have experienced a steep increase in recycling from 2008 to 2009. The graphs show large regional differences in the total recycling of MSW, of 7 to 10 percentage points for most years, and over 16 percentage points in 2009.

First of all, these differences for total recycling of MSW seem to be linked to differences in recycling of organic MSW, whereas the levels of material recycling only begin to differ significantly in 2009. In the region with the lowest organic recycling (Warminsko-Mazurskie) the level is almost zero.

The graphs therefore give a clear indication of how regional and local policies in Poland have indirectly had a significant influence on the recycling levels of MSW.

Figure 2.4 Regional differences in recycling of MSW in Poland

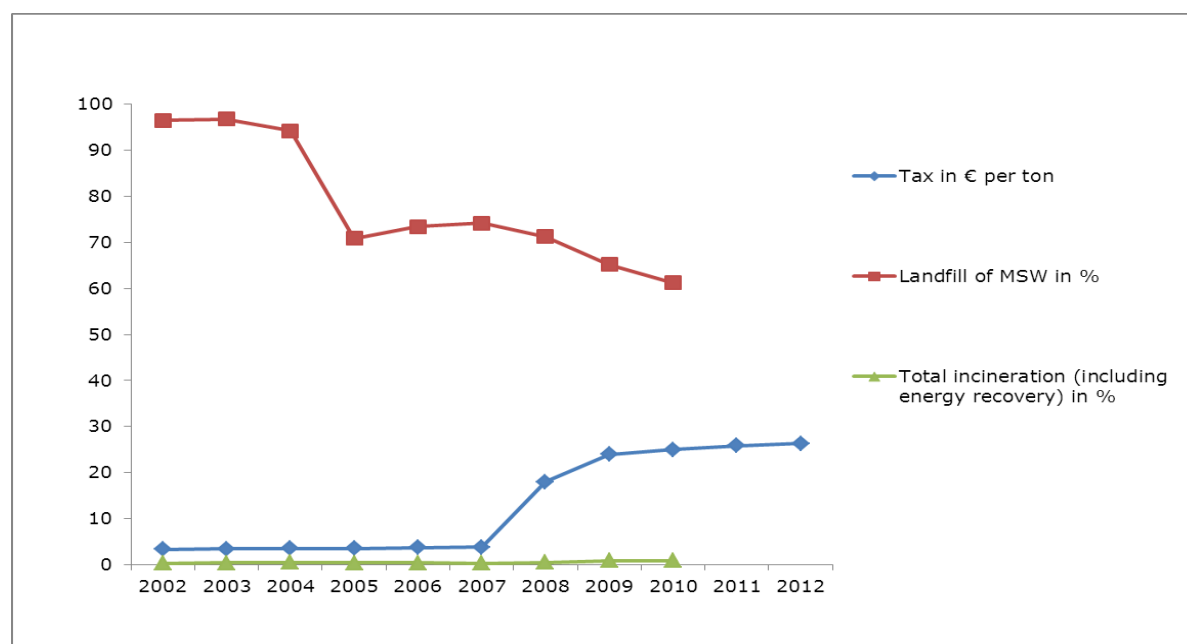


Source: Eurostat regional data, 2012

2.1.5 The relation between landfill tax level and recycling level of MSW

The first Polish Act to implement a landfill tax was prepared in 1997 and came into force on 1 January 1998 (Zambrzycki, B., 2012). The tax used four different tax levels and each of the approximately 850 different waste types in the European List of Waste was allocated a rate (ETC/SCP, 2012).

Figure 2.5 Development of landfilling and incineration of MSW and landfill tax on MSW in Poland



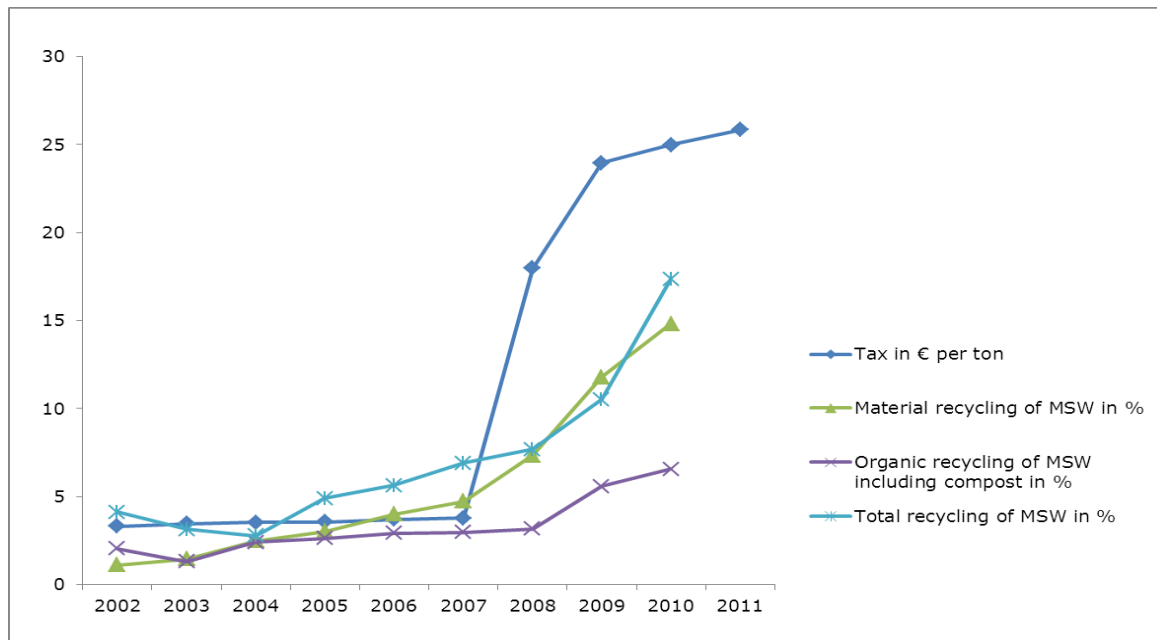
Source: ETC/SCP, 2012 and Eurostat, 2012. Note: The sudden decrease in landfilling from 2004 to 2005 is explained in the text.

The landfill tax is paid by the landfill operator (Malecki, P., 2010) with over 20 different types of rates existing by 2010. In general, the tax rates increase annually at a similar rate to inflation, with the exception of when the tax was increased significantly in 2008 as is shown in Figure 2.5.

It has to be underlined that the generation of MSW before 2005 is equal to the collected amount - and not the real generated amount. The landfill percentage curve declines much more drastically from 2004 to 2005 than the real decrease of landfilling because the reported amount changed from the collected amount to the generated amount from 2004 to 2005. However, Figure 2.5 clearly shows the effect of the tax: when the tax was raised in 2008 the amount of landfilled MSW dropped from 74 % to 71 % between 2007 and 2008 and from 71 % to 65 % between 2008 and 2009 (Malecki, P., 2010).

The landfill tax seems to have had little impact on the incineration of MSW. The incinerated amount of MSW increased only by 0.1 to 0.8 percentage points from 2001 to 2010. However, Figure 2.6 shows that the significant increase of the landfill tax for MSW is reflected in an increase of total recycling of MSW as well as material recycling and to a lesser extent of organic recycling.

Figure 2.6 Development of MSW recycling and landfill tax in Poland



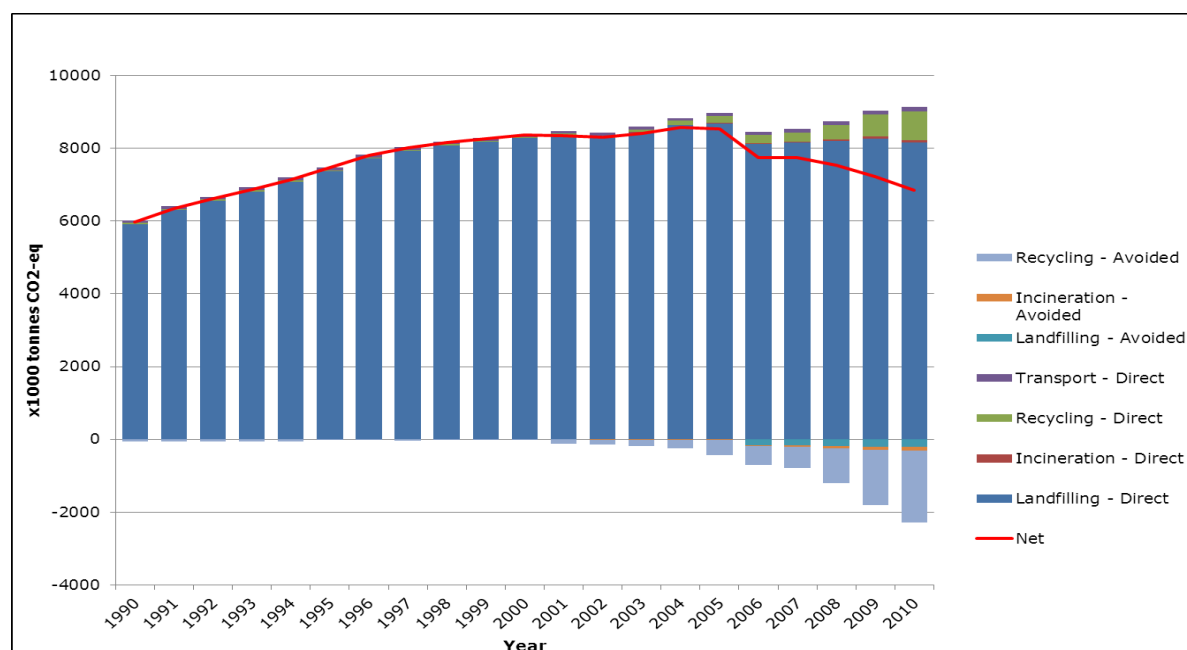
Source: ETC/SCP, 2012 and Eurostat, 2012

2.1.6 Environmental benefits of better MSW management

Figure 2.7 shows the development of GHG emissions from MSW management, calculated by using a life-cycle approach. The graph shows the direct emissions, the avoided emissions and the net emissions of the MSW management.

Figure 2.7 indicates a steady increase of direct emissions from landfilling until 2001, and that emission levels from landfilling have since remained almost constant. These levels of direct emissions from landfilling will also remain high for years to come due to the fact that recently landfilled BMW (e.g. five years ago) will continue to emit considerable amounts of greenhouse gases.

Figure 2.7 GHG emissions from MSW management in Poland²



Results presented in this figure should not be used for the compilation of GHG reporting (national inventory report of the IPCC) or compared with IPCC figures, as the methodology employed here relies on life cycle thinking and, by definition, differs from the IPCC methodology.

An immediate positive outcome is the fact that an increase in recycling of MSW has resulted in reduced greenhouse gas emissions. This is because products based on virgin material generate more emissions than those which are based on recyclables. This positive impact can already be recognised in Figure 2.7 in the period between 2006 and 2010.

2.2 Uncertainties in the reporting

Some uncertainties or differences in the reporting of MSW can result in different levels of recycling. One example of such differences which might influence the recycling rate of MSW in Poland is to what extent packaging waste from households and similar packaging from other sources is included in the reported recycling of MSW. Most Member States, including Poland, have producer responsibility schemes on packaging waste. and therefore packaging waste is not always reported to Eurostat as MSW.

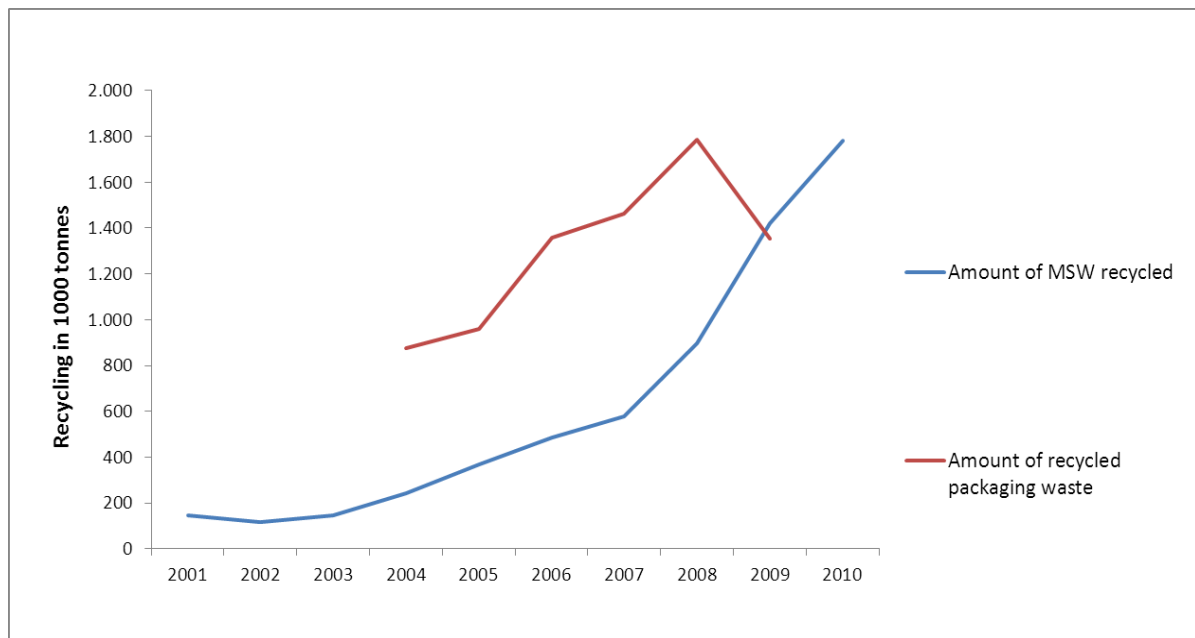
² All the GHG emissions (positive values) represent the direct operating emissions for each waste management option. These direct operating emissions have been calculated with the use of the IPCC methodology for landfills and life cycle modelling for the other technologies (incineration, recycling, bio-treatment and transport).

For the indirect avoided emissions (negative values), the calculations integrate the benefits associated with the recovery of energy (heat and electricity generated by incinerators, electricity generated by the combustion of landfill gas or methane from anaerobic digestion). Other avoided emissions include the benefits of recycling of food and garden waste, paper, glass, metals, plastics, textiles and wood in the municipal solid waste. Recycling is here assumed to include material recycling and bio-treatment. Avoided emissions of bio-treatment include fertilizer substitution. All processes generating electricity are assumed to substitute average electricity mix of Poland in 2002. Processes generating heat are assumed to substitute average heat mix for the EU25 in 2002. The electricity mix and heat mix are assumed to remain constant throughout the whole time series. The complete methodology is available from ETC/SCP (2011). The compositions of the MSW disposed in landfills, incinerated or recycled respectively are based on ETC/SCP (2011).

Figure 2.8 shows that the amount of recycled MSW in Poland was significantly lower than the amount of recycled packaging waste until 2008. According to the Polish Waste Management Plan 2014, 175 000 tonnes of glass from MSW were separately collected in 2008. Whereas in the same year the amount of glass packaging reported to Eurostat was 446 000 tonnes. Glass packaging waste is normally connected to private consumption. Even if some of this difference (446 000-175 000= 271 000 tonnes) according to the Polish Ministry of the Environment (Poland, 2012) is included in the amount of 336 000 tonnes labelled as “sorted out of from mixed waste” in table 2.1, it could indicate that not all glass packaging waste is reported as municipal waste.

Therefore, if a larger part of the recycled Polish packaging waste was regarded and reported as MSW, the total recycling of MSW could increase with several percentage points.

Figure 2.8 The extent of which Member States include recycling of packaging waste in their reporting of recycling of MSW from 2001 to 2010



Source: Eurostat, 2012

In other words, the rather low MSW recycling rate in Poland is partly due to a different way of reporting compared with other countries.

Another factor for uncertainty could be that in some countries the whole amount of MSW sent to Mechanical Biological Treatment (MBT), is allocated to recycling at the MBT plant. In other countries, it is in fact only the actual amount recycled after the MBT which is included, and not the amount subsequently sent to landfilling or incineration.

In the last two years Poland has increased the amounts of MSW sent to MBT from ¼ million tonnes to 0.6 million tonnes. It is currently not possible to answer to what extent this waste is used as compost and other uses such as aftercare of landfills, or if it is in fact landfilled after MBT (Eurostat, 2012a).

2.3 Important initiatives taken to improve MSW management

Municipal waste management was much affected by a rather radical shift towards privatisation when Poland switched to a market-based economy (Tojo, N., 2008).

The collection and management of municipal waste was no longer the responsibility of the municipalities as such, as it was now largely private owners of properties - individual houses as well as apartments - that selected a collection company. Waste collectors received money directly from their customers (i.e. citizens) in exchange for their service, and no money went to the municipality. This has created situations where different collection companies collected waste from households on the same street, making the collection system inefficient (Tojo, N., 2008). The companies have not had an incentive to invest in infrastructure, as the cheapest way of managing the waste was to send it to landfill. Many households also reportedly have dumped their waste illegally to avoid the costs of waste disposal altogether (ENDS, 2011).

The system has also implied that, apart from where a municipality received part of the national landfill tax, they have had no, or very limited, resources for waste management (Tojo, N., 2008). Altogether the situation described above has created uncertainties on how to implement better MSW management and it can be seen as one important explanation as to why the Polish MSW management has not reached a higher level of recycling.

Changes related to municipal waste management were suggested when the National waste management plan 2006-2010 was discussed. The suggested changes included shifting the ownership of MSW to municipalities instead of merely making them responsible for organising collection and treatment of MSW. It was also suggested that the system should be changed so that inhabitants should pay the waste fee to the municipalities instead of paying it to the waste collection companies. The latter had been proposed to the Parliament several times, before the proposal was changed to remove the waste fee for the municipalities. This was due to the heavy lobbying by the collection companies. Another feature of the former proposal was to enable the municipalities to establish some zoning system in order to facilitate efficient collection, but this was also not endorsed by the Parliament (Tojo, N., 2008).

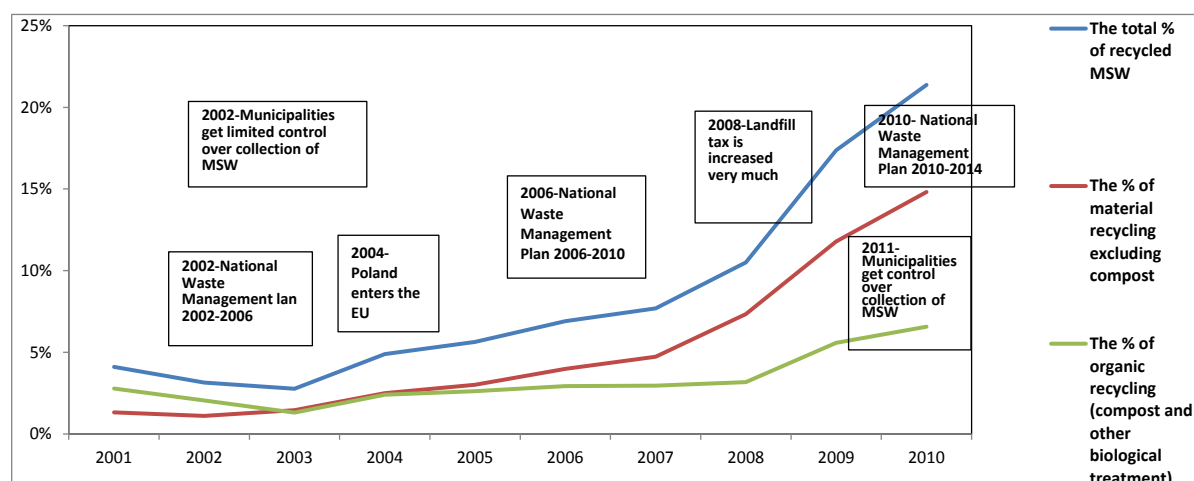
The discussion on reforming the municipal waste collection and recovery system in the municipalities (gminas) is also a part of the current National waste management plan 2014 (Poland, 2010). It is underlined in Chapter 1 that reforms can be achieved by giving local authorities considerably greater power to manage and control the MSW system of Poland (Poland, 2010). This time the municipalities' role in waste management was in fact changed so that responsibility to manage municipal waste was given to the local authorities (gmina), which entered into force on 1 January 2012 (ENDS, 2011). Under the new law, the responsibility to improve infrastructure, particularly waste collection and recovery, also lies with municipal authorities. This is expected to help Poland meet the goals set out in the EU Waste Framework Directive (ENDS, 2011).

Furthermore, the national waste management plan underlines the importance of providing financial support via environmental funds to cover investments in waste recovery and recycling (Poland, 2010).

The current national waste management plan 2014 also suggests that an important measure to increase recycling is to increase the charges for the landfilling of mixed waste, biodegradable waste and waste that can be subject to recovery (Poland, 2010). The significant increases of landfill taxes for MSW in 2008 appear to have already given strong incentives for diverting MSW from landfills. It seems that this increase of the landfill tax is the most important initiative which has been taken so far in order to divert MSW from landfills.

Furthermore, updating the act to maintain cleanliness and order in municipalities came into force on 1 January 2012. Within their administrative territory the municipalities have the responsibility to organize separate collection from households and institutions of wastes of paper, metal, plastic, glass, composite packages, and biodegradable municipal waste including biodegradable packaging. The municipalities have until the end of the first quarter of 2013 to establish such schemes (Poland, 2012).

Figure 2.9 Recycling of MSW in Poland and important policy initiatives



2.4 Future possible trends

Poland does not fulfil the criteria stated in Article 11 (3) of the EU Waste Framework Directive to get a derogation period for fulfilling the 2020 target of 50 % recycling of MSW. Therefore, as indicated in Figure 2.2, if Poland shall fulfil the 50 % recycling target by 2020, it is necessary to obtain a very high yearly increase of recycling from 2010 to 2020. The increase has to be at least 2.9 percentage points per year. It seems possible that part of the increase can be fulfilled by including some of the recycling of packaging waste from MSW sources more systematically in the reported amount of recycled MSW, cf. section 2.2.

Under all circumstances, the necessary increase in recycling will require a tremendous effort from the Polish government, the local authorities and a good cooperation between the public and private sector in order to secure sufficient treatment capacity. Chapter 3 in the Polish Waste Management Plan for 2010-2014 prescribes that the 50 % recycling-target will be achieved by ‘a very intensive development of separate collection and sorting of municipal waste’ (Poland, 2010). It seems to be very important that these initiatives are more detailed and operative if success is to be achieved.

The municipal treatment capacity (other than landfills) for organic waste and sorting of MSW was approximately 3.3 million tonnes by 1 January 2010 (Poland, 2010). Additional treatment capacity is therefore needed. The financial investments in the municipal waste management, which are to be undertaken by the public sector in the period from 2011-2013 are estimated to be PLN 4 108 million (EUR 984 million) of which PLN 2 900 million or 71 % is paid by the EU. In the period 2014-2016, the total public investments are estimated to be PLN 2 684 million (EUR 643 million) of which PLN 2 100 million or 78 % are expected to be financed by the EU (chapter 6, Poland, 2010). The above mentioned public investments are financed from the funds for Environmental Protection and Water Management into which the landfill tax is paid. The figures do not include local authorities’ investments. In other words, much of the central government’s investments are financed by the EU and additional municipal and private investments are needed.

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