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Municipal waste management in Slovakia

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Context
The Topic Centre has prepared this working paper for the European Environment Agency (EEA) under its 2012 work programme as a contribution to the EEA's work on waste implementation. The information about the Slovakian landfill tax has been updated in May 2014 based on information from the Slovakian Environmental Agency.

Contents

Highlights

Main points regarding MSW management in Slovakia:

- According to the latest data , 75 % of MSW generated in Slovakia was still landfilled in 2011;
- Around 10 % of MSW in Slovakia is incinerated with energy recovery. There are two incineration plants for MSW in Slovakia;
- Municipalities are responsible for MSW management in their administrative territories;
- There is a landfill tax in Slovakia, and the level of the tax has been increased since its introduction in 2004. In Slovakia the tax is called fee;
- Around 7 % of municipal waste is collected selectively. Existing recycling infrastructure is sufficient, but separate collection systems need to be improved further;
- The total recycling rate of MSW is still very low. According to present trends, an exceptional effort will be required to meet the EU requirement of 50 % MSW recycling in 2020;
- According to the amended Waste Act the municipalities in Slovakia were under an obligation to introduce separate collection for paper wastes, plastic wastes, metallic wastes, glass wastes and biodegradable waste by January 2010.

1 Introduction

1.1 Objective

Based on historical MSW data for Slovakia and EU targets linked to MSW, 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,
- Relation of the indicators to the most important initiatives taken to improve MSW management in the country, and
- Assessment of the future possible trends and achieving of the future EU targets on MSW by 2020.

2 Slovakia's MSW management performance

Waste legislation in Slovakia has been brought in line with EU regulations. Since 1993, the strategic direction of waste management has been defined through the concept document *Waste Management Programme of the Slovak Republic* (hereinafter WMP SR), adopted by the government. The WMP SR is evaluated regularly (as a rule, every five years) and new targets have been set out for the next period (EEA, 2010).

Since 1993, there have been 5 WMP SR, and the *Waste Management Programme of the Slovak Republic 2011-2015* is the latest one. The *Waste Act* was adopted in 2001 and has been further amended in 2006 (Act No. 409/2006 Amending the Waste Act No. 223/2001 on Waste). A new waste act that will compile all existing waste related regulations and decrees is expected by the end of 2012 (BIPRO, 2012).

Due to the proceedings before the Court of Justice of the EU for failure to transpose the Waste Framework Directive, the Ministry of Environment of the Slovak Republic has taken the decision to prepare a new amendment of the existing Waste Act. The amended Waste Act should enter into force on 1 January 2013. A completely new Waste Act will be prepared later (SK, SEA, 2012).

Among the recent achievements in municipal waste management in Slovakia are (BIPRO, 2012; (Slovakia, 2014);):

- 100 % collection coverage;
- the majority of EU legal requirements are well transposed in national waste legislation;
- sufficient treatment capacity is available (landfill, incineration);
- producer responsibility schemes are in place for packaging, WEEE, ELV, batteries, paper/cardboard and tyres;
- PAYT[1] can be applied by the municipalities, where it is found appropriate;

[1] Pay As You Throw

- closing of landfills not in compliance with the Landfill Directive.

The total amount of municipal waste generated in Slovakia in 2010 was 1 809 000 tonnes i.e. 333 kg per capita (Eurostat, 2012). Treatment rates of municipal waste are shown in Table 1.

Table 1: Treatment rates of municipal waste in Slovakia in 2010, as percentage of MSW generated

Treatment	Rate (%)
Material recycling	3.6
Composting	5.0
Incineration with energy recovery	9.5
Incineration without energy recovery	0.7
Landfilling	78.0
No information	3.2
TOTAL	100

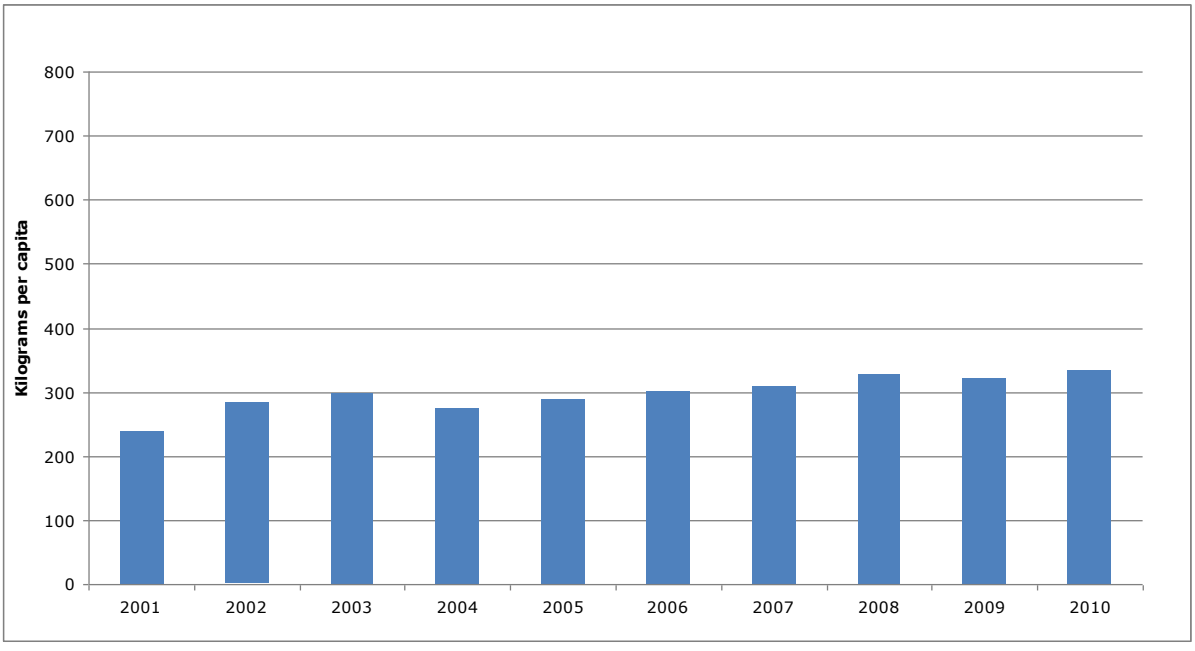
Source: Eurostat 2012

However, according to estimations of the Slovak Environmental Agency, around 65 % of MSW is landfilled. This rate may be even lower if packaging waste is taken into account (SK, SEA, 2012)

2.1 MSW Indicators

Figure 2.0 shows the development of MSW generation per capita in Slovakia from 2001 to 2010.

Figure 2.0 MSW generation per capita in Slovakia



Source: Eurostat, 2012; Break in series in 2002. Data until 2001 according to national waste catalogue, from 2002 onwards according to the European List of Waste.

The amount of generated MSW per capita has increased by 18 % from 2002 to 2010.

Generation of MSW has increased from 1.5 million tonnes in 2002 to 1.8 million tonnes in 2010. Landfilling of municipal waste still prevails - around 80 % MSW is landfilled (EEA, 2010). Compared with other EU Member States that entered the EU in 2004-2007, Slovakia has a quite high percentage of incineration with energy recovery of MSW (10 %). There are two incineration plants for MSW, one in Bratislava and one in Kosice.

The amount of separately collected fractions of MSW increased from 3 % in 2002 to 7 % in 2009 (SOSR, 2012).

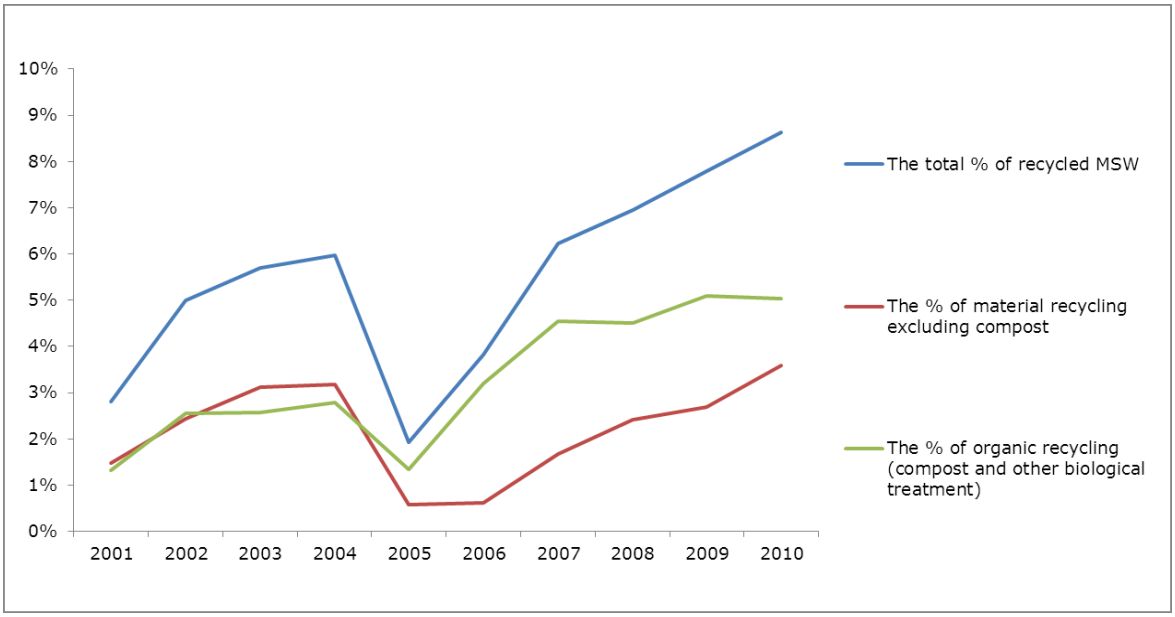
The problem of old and illegal dump sites still exists and has yet to be adequately addressed (BIPRO, 2012). There were an estimated 300 illegal dump sites in 2007 (BIPRO, 2012).

2.1.1 The recycling of MSW from 2001 to 2010

Figure 2.1 shows the development of recycling of MSW in Slovakia in terms of total recycling, material recycling and organic recycling (composting and other biological treatment). As illustrated, the recycling level is low but after 2001 there has been a positive trend in the recycling of MSW, with a considerable drop[2] in 2005. The positive trend has since continued, with the total percentage of recycled MSW increasing from 3 % in 2001 to 9 % in 2010. In absolute terms recycling of MSW increased from 36 000 tonnes in 2001 to 156 000 tonnes in 2010.

Figure 2.1 Recycling of MSW in Slovakia

[2] This drop can partly be explained as a statistical issue. 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. Furthermore, from 2005, the data collection system was changed with new R and D codes (according to the Waste Framework Directive), causing a loss of information on final recovery of municipal waste, mainly in recycling and less significantly in composting (Eurostat, 2012). A specific treatment code Z (temporary storage) was introduced in 2005. Reporting units (municipalities) tended to use this specific code when having difficulties in allocating the right recovery and disposal codes to the waste. This problem has been eliminated step by step, mainly by consultations with the responding units (SK, SOSR, 2013).



Source: Eurostat, 2012. Since 2005, the percentages are calculated as % of generated MSW, 2001-2004 values are calculated as percentage of collected waste amounts.

The total increase of recycling is linked both to material and organic recycling, but the share of organic recycling is higher. Organic recycling has increased from 1 % (17 000 tonnes in absolute amount) in 2001 to 5 % (91 000 tonnes) in 2010. In the same period, material recycling has seen a slightly lower increase – from 1 % in 2001 to 4 % in 2010.

The official data source for MSW data in Slovakia is the 'Statistical survey on municipal waste' conducted by the Statistical Office of the Slovak Republic. It is an exhaustive annual survey (reporting units are all municipalities of Slovakia). This data source is used for all official publishing and reporting of MSW data (to Eurostat, OECD, etc.). All waste under category 20 of the European List of Waste (Municipal wastes and similar commercial, industrial and institutional wastes including separately collected fractions) is included in those data. However, recycled packaging waste belonging to category 15 of the European List of Waste is not included in MSW data (SK, SOSR, 2012).

The Slovak Environmental Agency presumes that the official MSW data from the Statistical Office of the Slovak Republic undervalue the recycling due to incorrect reporting of data by some municipalities. The Environmental Agency estimates the amount of recycling and landfilling of MSW using data sets taken from the national waste information system. According to that approach, the real situation in waste management in Slovakia, in particular in MSW recycling, is much better than it appears in the officially reported data (SK, SOSR, 2012.

According to the calculation of the Slovak Environmental Agency, the recycling rate of MSW in 2010 was around 14 % and around 16 % in 2011 (SK, SEA, 2012).

Still, there is room for improving both material and organic recycling, but it seems that material recycling in particular can be improved.

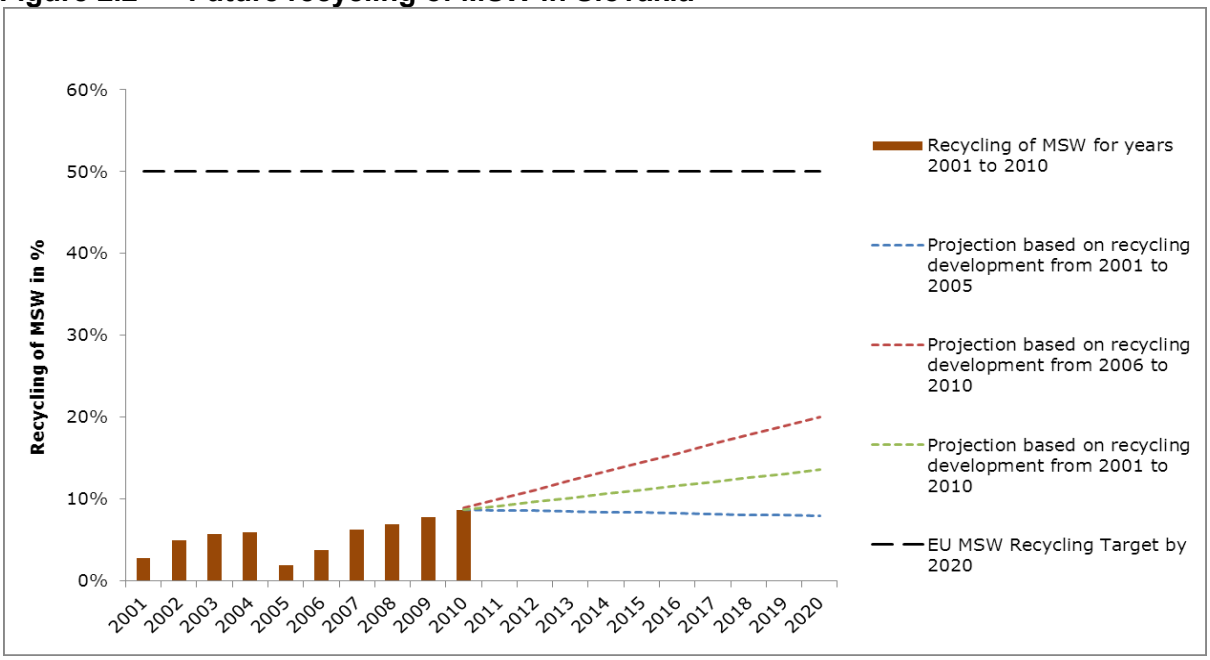
2.1.2 The yearly increase rate of recycling of MSW

In order to assess the prospects for Slovakia to meet the 50 % recycling target as set out in the Waste Framework Directive[3], three scenarios have been calculated. These scenarios assume that recycling increases in the period 2010 to 2020 at the rates experienced in 2001-2005, 2006-2010 and 2001-2010, respectively. The projections are based on a linear regression.

Figure 2 shows that if the rate of increase in recycling over the last five years can be maintained, the recycling rate would reach 20 % in 2020, which is far below the 50 % target set in the EU legislation for 2020. Therefore, it will require an exceptional effort in Slovakia to fulfil the recycling of 50 % by 2020. It should be noted that the projections in the scenario using the 2001 to 2005 recycling rate are severely influenced by the change of statistical approach and the resulting drop in recorded recycling in 2005.

[3] The EU 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), and this method is used in this report.

Figure 2.2 Future recycling of MSW in Slovakia



Source: Calculation done by Copenhagen Resource Institute (CRI) based on Eurostat, 2012

It has to be kept in mind that these three scenarios are very simplistic and do not take into account any planned policy measures and the break in registration of material recycling in 2005 explained in Figure 2.1. 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.

2.1.3 Landfilling of biodegradable municipal waste

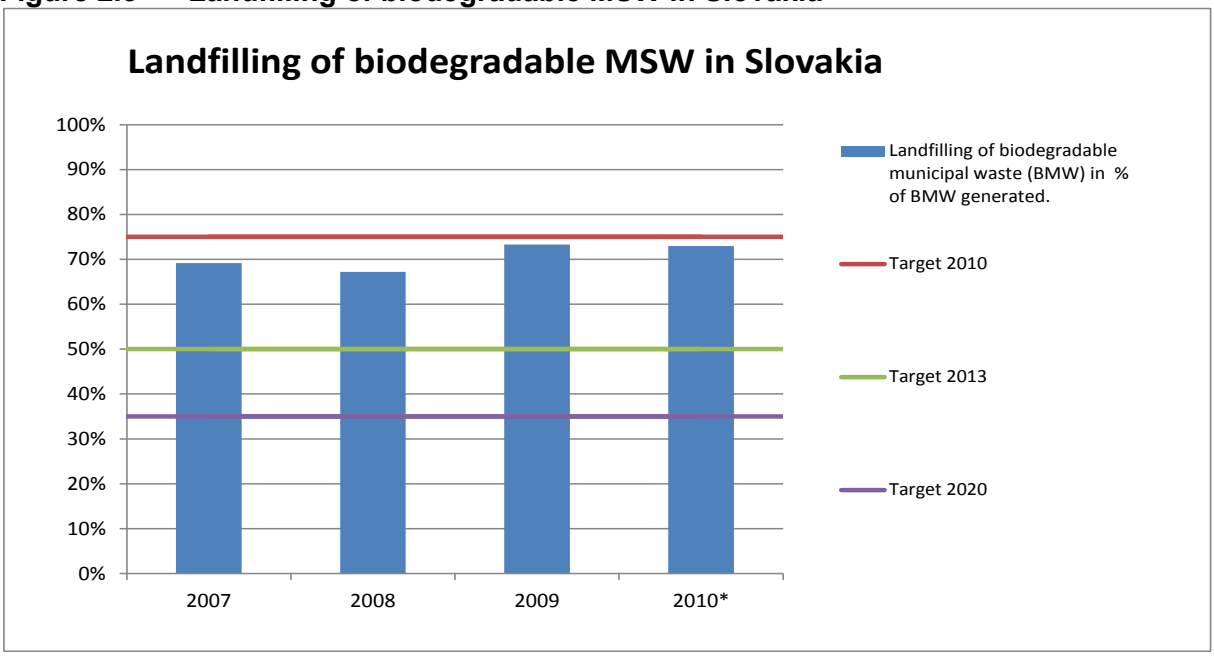
According to the EU Landfill Directive, Member States have to reduce the amount of biodegradable municipal waste (BMW) landfilled by a certain percentage by 2006, 2009 and 2016. As a country that landfilled more than 80 % of its MSW in 1995, Slovakia has been granted a derogation period of four years and thus has to meet the targets by 2010, 2013 and 2020, respectively. In 1995, Slovakia generated 695 000 tonnes of BMW.

In Figure 2.3 the amount of landfilled BMW in 2010 has been calculated by subtracting the 2009-2010 increase in the amount of MSW going to composting and digestion (Eurostat, 2010) from the amounts of BMW being landfilled in 2010.

In 2007 (no data for 2006 available) the landfilled amount of BMW was 480 829 tonnes i.e. 69 % of the quantity generated in 1995, whereas the target of the Landfill Directive for Slovakia for 2010 (with derogation) was 75 %. But compared to 2007, the estimated amount of landfilled BMW in 2010 increased to 507 253 tonnes i.e. 73 % of the quantity generated in 1995. Although the amount of landfilled BMW was higher than in 2007, the target value for 2010 is likely to have been successfully achieved.

The figure also indicates that considerable efforts have to be undertaken in Slovakia to fulfil the 50 % target by 2013 and the 35 % target by 2020.

Figure 2.3 Landfilling of biodegradable MSW in Slovakia



Source: EC, 2012 and calculation done by Copenhagen Resource Institute (CRI) * The figures for 2010 are CRI estimations. The target dates take account of Slovakia's 4 years derogation period.

2.1.4 Regional differences of MSW recycling from 2001 to 2010

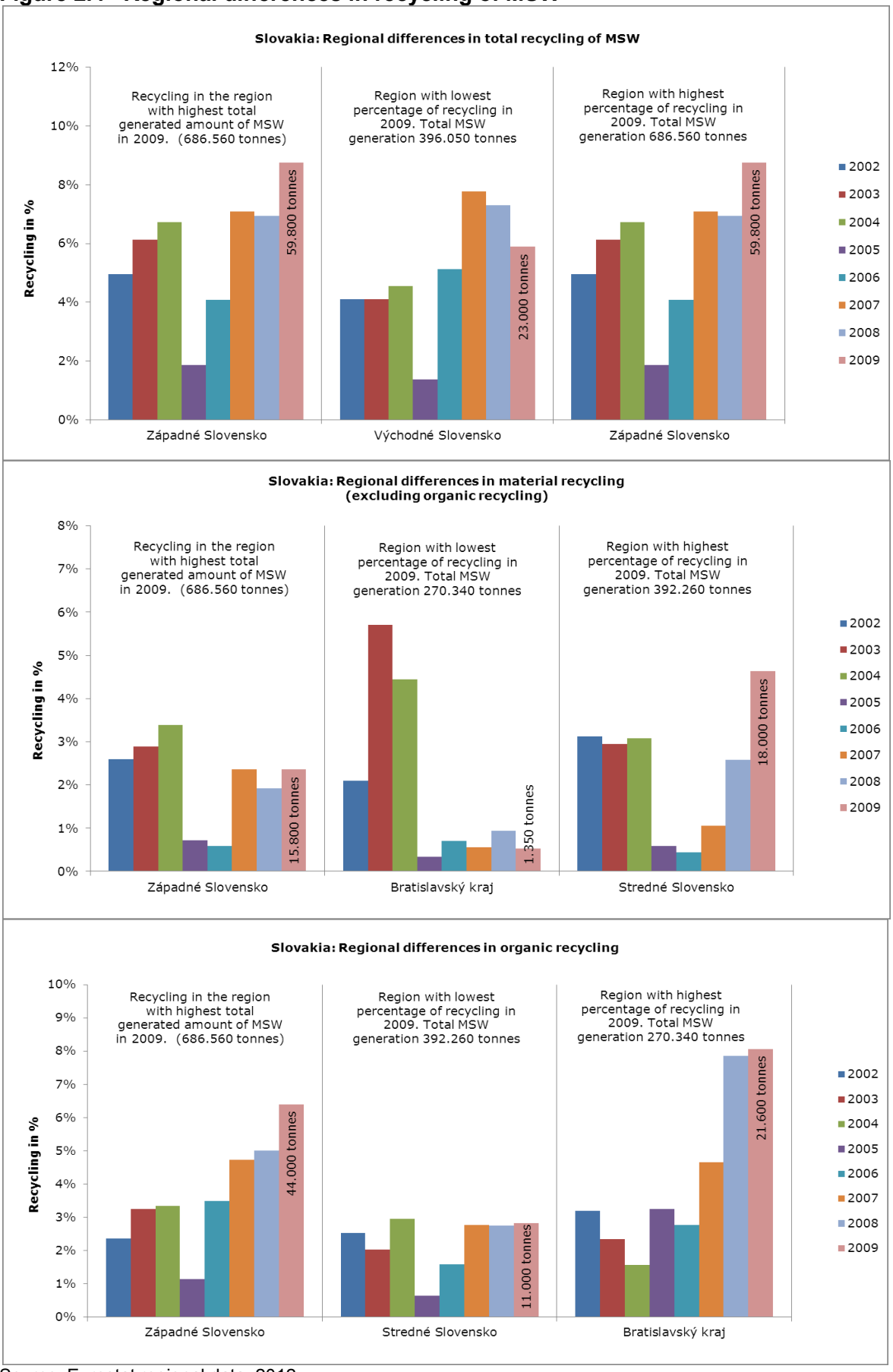
Figure 2.4 shows regional differences in the development of MSW recycling from 2002 to 2009 in terms of total recycling, material recycling and organic recycling. For each type of recycling three different regions have been chosen:

1. Recycling in the region with the highest total generated amount of MSW in 2009;
2. Recycling in the region with the lowest percentage of recycling of the respective waste type in 2009; and
3. Recycling in the region with the highest percentage of recycling of the respective waste type in 2009.

The graphs show that regional differences in total recycling of MSW are not so large, whereas those in material and organic recycling are higher. There is also a considerable drop in recycling identified in 2005. As it has been previously mentioned (in section 2.1.1) this drop may be explained as a statistical issue as opposed to a real decrease in recycled amounts.

The graphs therefore give a clear indication that regional and local policies in Slovakia have had a reasonable influence on the recycling levels of MSW, with preferences for material recycling in some regions and for organic recycling in others.

Figure 2.4 Regional differences in recycling of MSW



Source: Eurostat regional data, 2012

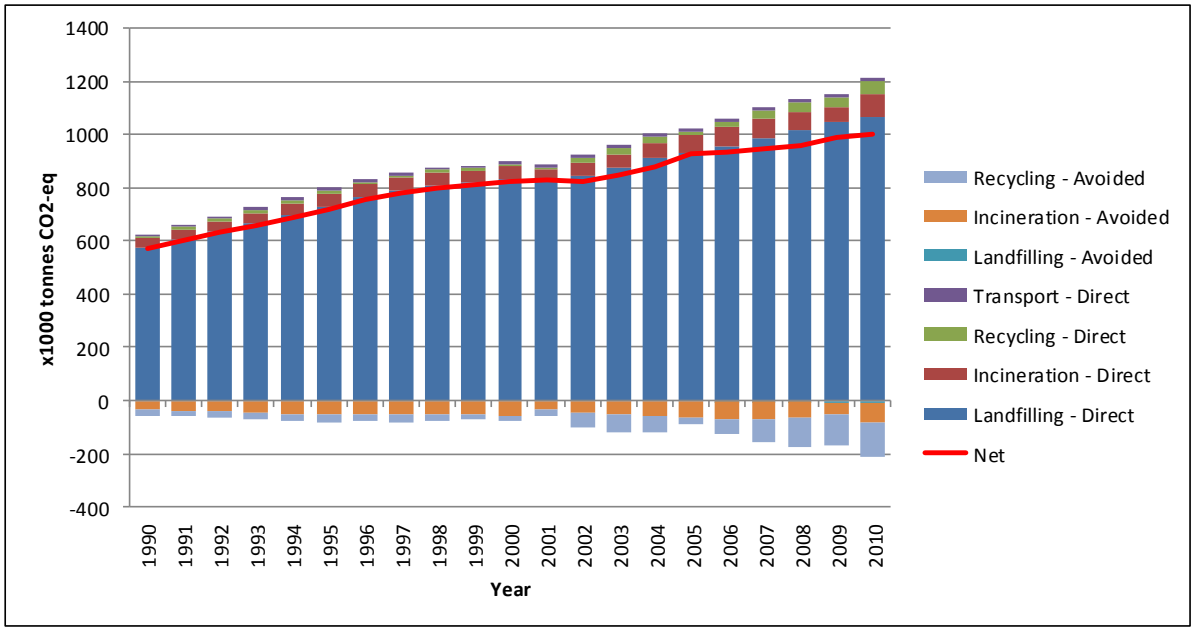
2.1.5 The relation between landfill tax level and recycling level of MSW

There is a landfill tax in Slovakia according to Act No. 17/2004 Coll. on charges for landfilling of waste. The tax is called fee in Slovakia. The tax varies according to waste type. From 1 January 2014 it is not possible to landfill mixed MSW; it must be subjected to sorting before landfilling. When the MSW is sorted out into less than four fractions, the tax is EUR 9.96 per tonne. If MSW is sorted out into five fractions, the tax is EUR 4.98 per tonne (Slovakia, 2014). The municipality within which the landfill is sited gets a part of the tax revenue income to support investments in waste management.

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 GHG emissions from MSW management in Slovakia[4]



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.

[4] 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, biotreatment 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 biotreatment. Avoided emissions of biotreatment include fertilizer substitution. All processes generating electricity are assumed to substitute the electricity mix of Slovakia in 2009. Processes generating heat are assumed to substitute the average heat mix for the EU-25 in 2002. The electricity mix and heat mix are assumed to remain constant throughout the entire time series. The compositions of the MSW disposed in landfills, incinerated or recycled respectively are based on Bakas et al., (ETC/SCP, 2011). In an Eionet consultation process, initiated by the EEA in 2012, Slovakia updated the compositions of the landfilled and recycled MSW for 2008. The complete methodology is available from (ETC/SCP, 2011).

As it is shown in Figure 2.7, net emissions have been increasing constantly since 1990, reaching their maximum in 2010. Direct emissions from landfilling have followed the same trend. It is reasonable to assume that direct emissions from landfilling will continue to be high for several years ahead because BMW landfilled in previous periods will continue to emit considerable amounts of GHG.

Avoided emissions have increased since 1990 with some fluctuations. The avoided emissions are comprised mostly of emissions avoided through recycling, and to a lower amount by incineration with energy recovery (i.e. energy generated from waste incineration replacing the average energy mix).

Increase in recycling of MSW may result in further reduced GHG emissions in the future. This is because products based on virgin material generate more emissions throughout their life cycle than those which are based on recyclables. Slovakia is yet to gain substantial benefits in this area due to the low level of recycling.

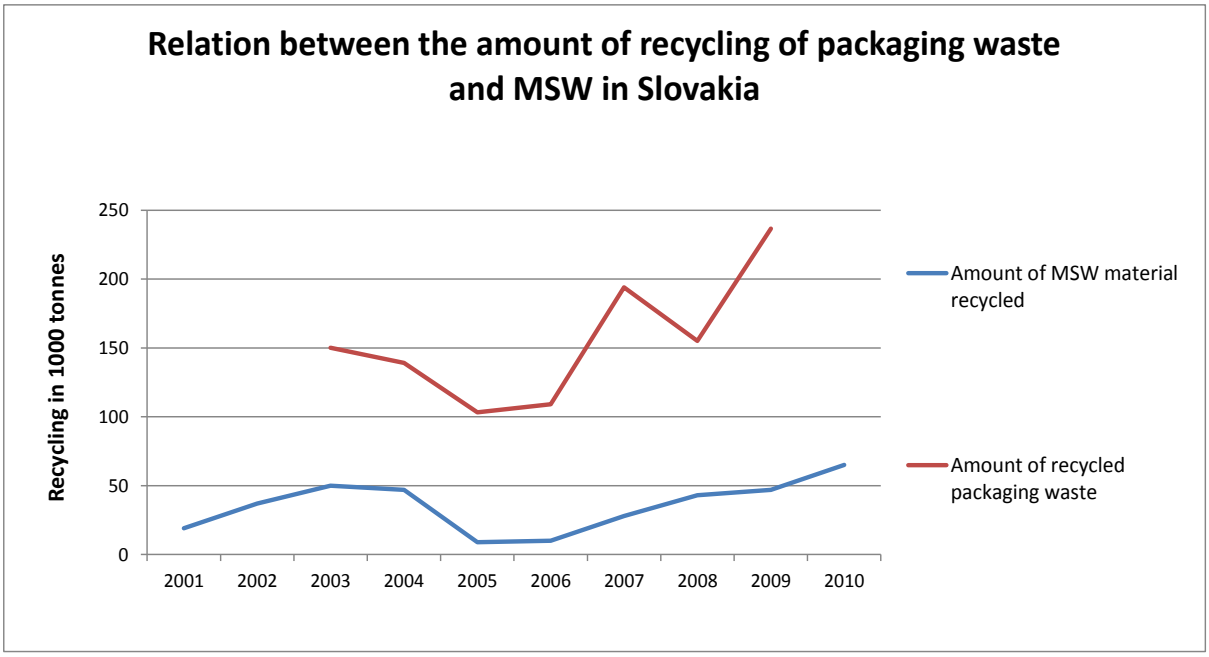
2.2 *Uncertainties in the reporting*

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 Slovakia 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 Slovakia, have producer responsibility schemes on packaging waste. Private operators of these schemes do not always report on the sources of the collected packaging waste, and therefore packaging waste is not always reported to Eurostat as MSW.

Figure 2.8 shows that the amount of recycled MSW in Slovakia was significantly lower than the amount of recycled packaging waste, and the development trends between packaging waste recycling and MSW recycling differ considerably. This indicates that Slovakia has not included the recycled packaging waste from households and similar packaging from other sources in its reporting of recycled MSW to Eurostat. This has been confirmed by the Slovakian authorities. According to the official reporting of MSW data recycled packaging waste belonging to category 15 of the European List of Waste is not reported as recycled MSW (SK, SEA, 2012).

Figure 2.8 Comparison of packaging waste recycled and material MSW recycled



Source: Eurostat, 2012

Another potential source of uncertainty is that some countries allocate the total amount of MSW sent to Mechanical Biological Treatment (MBT) to recycling. In other countries, only the actual amount of recycled material recovered in the MBT is included, and not the waste material that is afterwards sent to landfill or incineration. It seems that Slovakia is currently not using MBT for MSW treatment, so this uncertainty does not apply here.

2.3 Important initiatives taken to improve MSW management

The state of the general environmental awareness of the public is rather low and needs substantial improvement. Thus, raising awareness and involving citizens can be an important tool for promoting better waste management (BIPRO, 2012).

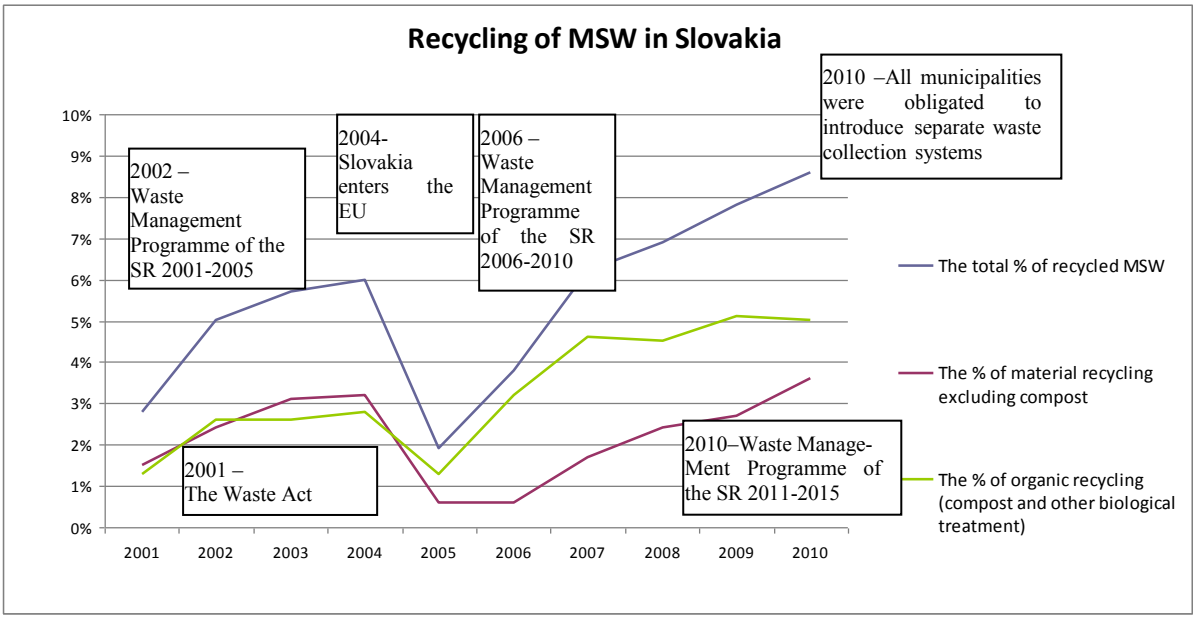
In order to increase levels of awareness, numerous information campaigns addressing certain target groups (e.g. households, the public, businesses, schools, tourists, industry, etc.) have been organised.

Criteria for landfill restrictions are defined in the Waste Act. Limit values are currently defined only for non-hazardous waste landfills. The limit values for the other landfill categories will be determined in a new decree to the Waste Act (BIPRO, 2012).

To improve waste management, activities for the improvement of separate collection systems and the recovery of selected waste types are supported through state subsidies (by means of the state Environmental Fund) as well as financed from the non-state Recycling Fund. In the period 2007 – 2013, the Operation Programme Environment financed by European Funds with its priority No. 4 Waste Management supported and will support the development of waste management infrastructure in Slovakia with about EUR 570 million (EEA, 2010).

The existing recycling infrastructure is sufficient and could even handle an increased rate of separately collected waste (BIPRO, 2012).

Figure 2.9 Recycling of MSW in Slovakia and important policy initiatives



Source of data: Eurostat, 2012. Since 2005, the percentages are calculated as % of generated MSW, 2001-2004 values are calculated as percentage of collected waste amounts.

Competent authorities in Slovakia have planned some measures in the field of municipal waste management. Among those measures are (BIPRO, 2012):

- Improvement of conditions for separate collection by using information campaigns and infrastructural investments including adopted collection schemes;
- Elimination of illegal dumpsites;
- Improvement of technical conditions for waste processing and recycling;
- Minimization of landfilling of municipal waste by improving alternative waste management infrastructure and use of financial tools;
- Full implementation of the polluter pays principle in the whole country and increasing the fees for landfilling of waste;
- Information and awareness campaigns for the public to stop littering and improve environmental protection related to waste issues;
- Further improvement of the quality (reliability) of waste management data.

2.4 Possible future trends

As indicated in Figure 2.3, considerable efforts have to be undertaken in Slovakia to fulfil the Landfill Directive's diversion targets of landfilled BMW by 2013 and by 2020.

As it is indicated in Figure 2.2, it will require exceptional efforts and very high yearly increase of recycling of MSW from 2010 to 2020 in order to fulfil the Waste Framework Directive's target to recycle 50% of municipal waste by 2020. The increase has to be at least 3-4 percentage points per year, and it would require huge efforts from the government and the local authorities, as well as a good co-operation between the public and private sector.

Figure 2.8 indicates that MSW recycling rates would be higher if some of the recycled packaging waste from MSW sources would be included systematically in the reporting of recycled MSW. In addition, according to the calculation of the Slovak Environmental Agency, the recycling rate of MSW in 2010 was around 14 % and around 16 % in 2011 (SK, SEA, 2012). It is therefore important to improve the data situation in order to get a reliable picture of the MSW management situation and measure progress towards better waste management.

According to the country assessment on waste provided by Slovakia (EEA, 2010), in the coming years, a slight increase in municipal waste generated in Slovakia can be expected. The amount of material recovery including composting and energy recovery of municipal waste is very low and did not substantially approach the target set in the WMP until 2010. Slovakia therefore sees a need to extend separate collection as well as improve the level of home composting (EEA, 2010).

The Waste Act establishes a deadline for the introduction of separate waste collection for waste paper, plastics, metals, and glass, but not for bio-waste. Separate collection of bio-waste will be introduced by a new amendment of Waste Act which should enter into force on 1 January 2013. (SK, SEA, 2012)

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