ETC/SCP

European Environment Agency

Municipal waste management in Romania

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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.

Contents

Highlights

- Recycling of municipal waste has started recently and the recycling rate is still very low (2 %);
- Romania only includes recycled packaging waste from households to a limited extent in the reporting of MSW recycled;
- The main challenge is to develop the infrastructure for recycling of municipal waste;
- An exceptional effort will be required to meet the EU requirement of 50 % MSW recycling in 2020;
- The 2010 target for biodegradable municipal waste sent to landfill seems to have been met but the quality of the data is uncertain;
- So far few policy steps have been taken towards improving recycling and new initiatives are required.

1 Introduction

1.1 Objective

Based on historical MSW data for Romania 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 Romania's MSW management performance

The first National Waste Management Strategy in Romania was developed in 2003, and published in early 2004, following the transposition of European legislation in the field of waste management and according to the provisions of the Emergency Government Ordinance no.78/2000 on the regime of waste, approved in 2001. The strategy was intended to cover the period 2003-2013, and was set to be subject to periodical revisions (Romania, 2004). The strategy is based on the principle of protection of primary resources, the prevention principle, 'the polluter pays' principle correlated with the principles of producer and user responsibility, the substitution principle, and the principle of proximity correlated with the principle of autonomy.

The National Waste Management Plan was also developed in 2004 in order to take the necessary actions to reach the objectives of the strategy (Romania, 2004). In order to increase the efficient implementation of the National Waste Management Plan, Regional Waste Management Plans for the eight Romanian regions were issued in 2006 (Larive, 2011).

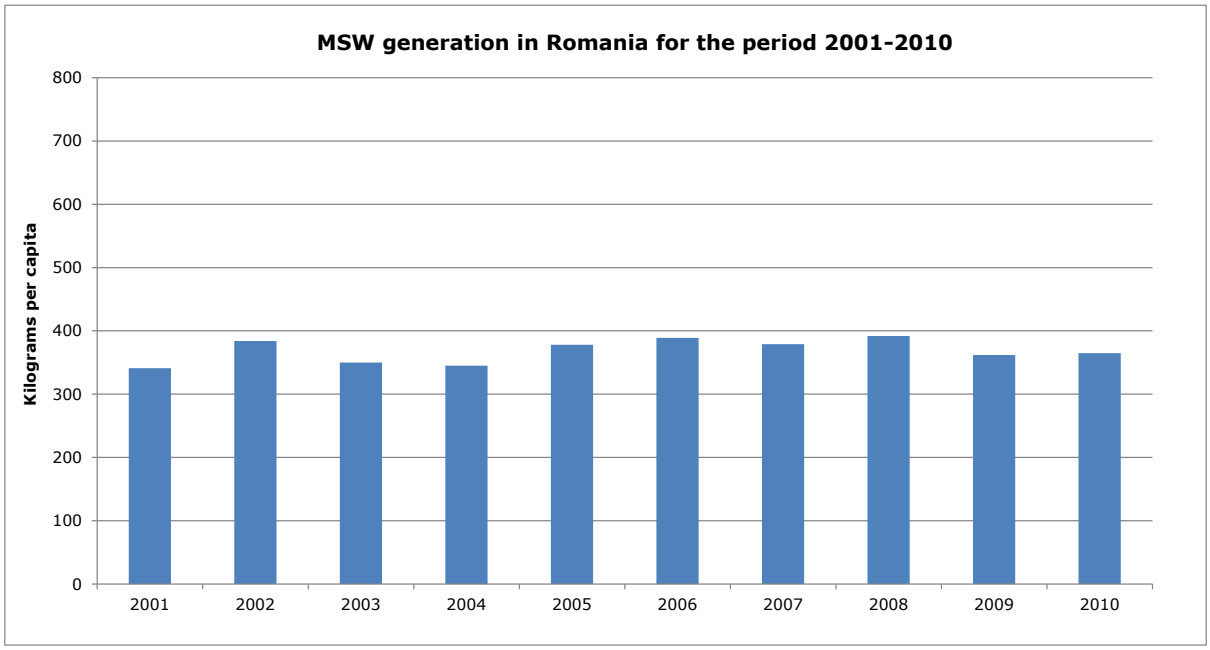
The responsibility for the collection and management of municipal solid waste belongs to the municipalities. By 2009, 63 % of the population in Romania benefited from collection services; this consisted of 84 % in the urban areas and only 38 % in rural areas. A total of 6 296 000 tonnes of waste was collected and treated in 2009. The waste generated by the part of the population who are without access to waste collection services has been calculated using a standard daily rate of 0.9 kg/capita/day for the urban areas and 0.4 kg/capita/day in rural areas. This, according to the levels reported to Eurostat, determined the total estimated quantity of generated municipal solid waste to be 7 830 000 tonnes in 2010.

The evolution of collected and treated municipal waste quantities is not characterised by a specific trend. However, two peaks can be noticed; in 2002 with approximately 6 865 000 tonnes and in 2008 with 6 561 000 tonnes (Eurostat, 2012). This variation can be explained by poor data quality and differences in the calculation methodologies used over the years, an issue discussed further in this paper.

2.1 MSW Indicator

Figure 2.0 shows the development of MSW generation per capita in Romania from 2001 to 2010. There has been an increase from 341 kilogram per capita in 2001 to 392 kilogram in 2008. From 2008 to 2010 there was a decrease from 392 kilogramm to 365 kilogramm per capita. This decrease might be linked to the start of the economic crisis in 2008.

Figure 2.0 MSW generation per capita in Romania



Source: Eurostat, 2012.

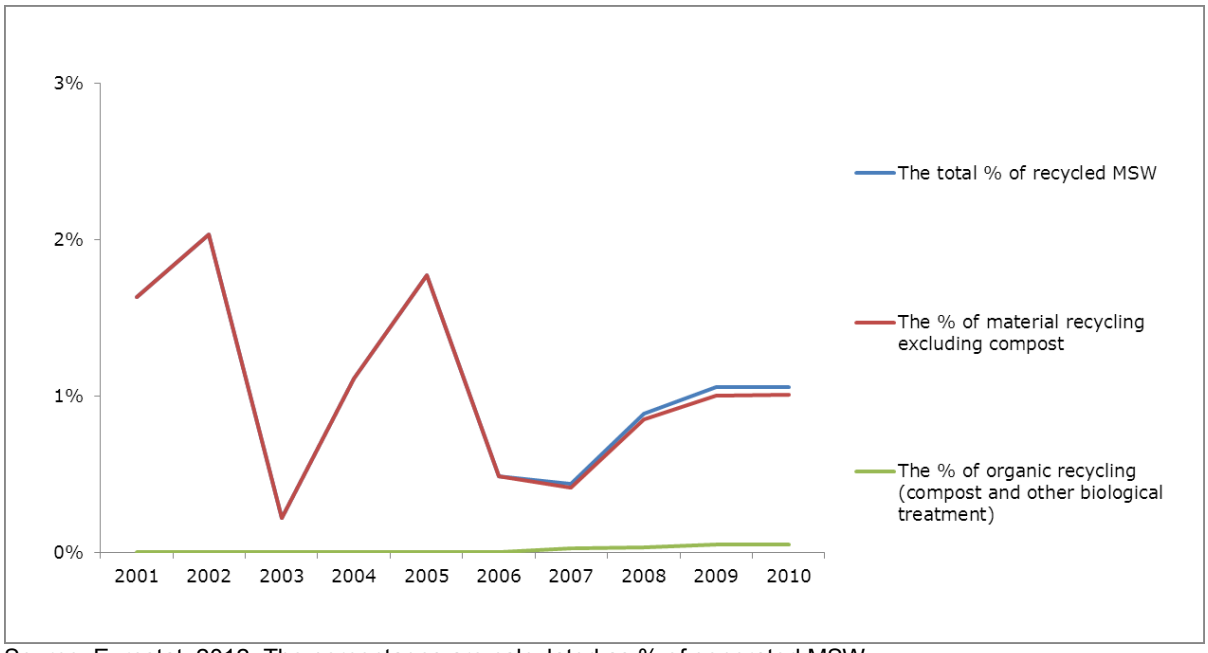
More than 95 % of the total collected municipal waste is landfilled in Romania, with only small amounts being recycled or co-incinerated (NEPA, 2010). In 2010 for example, from the total amount of MSW collected, only 1% was recycled (Eurostat, 2012).

2.1.1 The recycling of MSW from 2001 to 2010

The evolution of MSW recycling in Romania is illustrated in figure 2.1 in terms of total recycling, material recycling and organic recycling (compost and other biological treatment). It should be taken into consideration that the data for 2001 and 2002 were provided by an administrative source and that the methodology of data collection and processing was changed in 2003 (Eurostat, 2010).

Separate MSW collection practices were adopted in Romania in 2006, through the development of several pilot projects. Following this period, in the period 2007-2017 the municipalities are required to develop a solid infrastructure for this practice, which is expected to boost the recycling levels. Only 75 000 tonnes of MSW have been collected selectively in 2008, and 83 000 tonnes in 2010 according to Eurostat (2012).

Figure 2.1 Recycling of MSW in Romania



Source: Eurostat, 2012. The percentages are calculated as % of generated MSW.

The total level of recycling of MSW in Romania is very low and did not increase during the last ten years. The composition of the total quantity of separately collected waste in 2010 can be seen in Table 2.1. Figure 2.1 indicates that organic waste is recycled in very small amounts, and this is mainly performed by households for their own purposes. In other words, there is room for improving both material and organic recycling of MSW.

Table 2.1 Composition of separately collected municipal waste in Romania in 2010. Stated in 1000 tonnes

Total quantity of collected materials (1000 tonnes)	PET	Plastic	Paper/ Cardboard	Glass	Metal	Wood
58.24	13.15	7.46	27.19	7.80	1.06	1.54

Source: NEPA, 2010

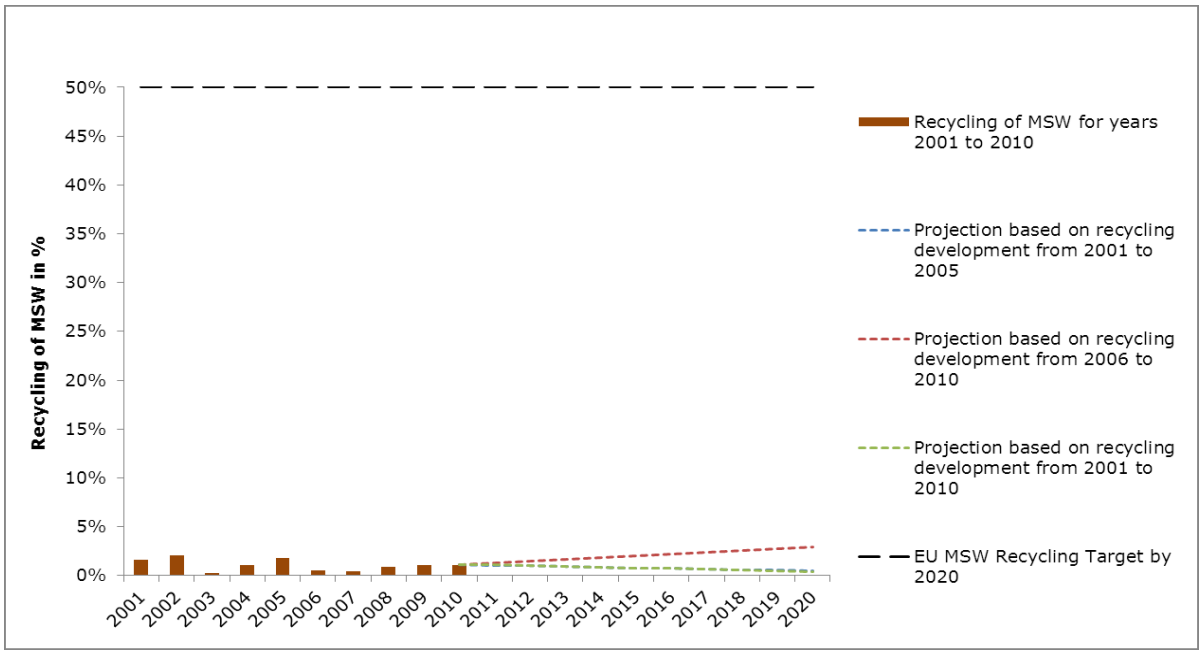
Paper/cardboard is the most recycled material (46.6 % of the recycled waste), which is in large part due to the fact that there are many awareness campaigns in schools and education institutions where paper is collected. Furthermore, there is a tradition for separately collecting paper waste in Romania.

2.1.2 The yearly increase rate of recycling of MSW

In order to assess the prospects for Romania to meet the 50 % recycling target as set out in the Waste Framework Directive1, three scenarios have been calculated. These scenarios assume that recycling increases in the period 2010 to 2020 at the rate experienced in 2001-2005, 2006-2010 and 2001-2010 respectively. The projections are based on a linear regression.

[1] The EU's 2008 Waste Framework Directive (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).

Figure 2.2 Future recycling of MSW in Romania



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

Please note 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 shows how the recycling level of MSW would develop in Romania based on the extrapolation of the trends in the periods 2001-2005, 2006-2010 and 2001-2010.

As the recycling rate did not change much since 2001, all three scenarios based on past trends result in little progress until 2010. Figure 2.2 clearly illustrates that the target of 50 % MSW recycled will only be reached by 2020 if Romania makes an exceptional effort. Significant improvements in the yearly increase of recycling rates are needed in order to meet EU legislation targets in the coming years.

2.1.3 Landfilling of biodegradable municipal waste

The EU Landfill Directive implies that all Member States must reduce the amount of biodegradable municipal waste landfilled with a certain percentage by 2006, 2009 and 2016 in comparison to the generated BMW level in 1995. Countries that were landfilling more than 80 % of their MSW in 1995 had the option to obtain a derogation period of maximum four years. Romania qualified for this derogation and has to meet the targets by 2010, 2013 and 2020.

In the reference year Romania landfilled 4.80 million tonnes of BMW, and according to data reported to the European Commission, 92 % of this amount was treated in the same way in 2006. This percentage dropped to 81 % in 2007 and 76 % in 2008 (EC, 2012). In 2009, the percentage was 75 % (NEPA, 2010) indicating an early fulfilment of the 2010 target.

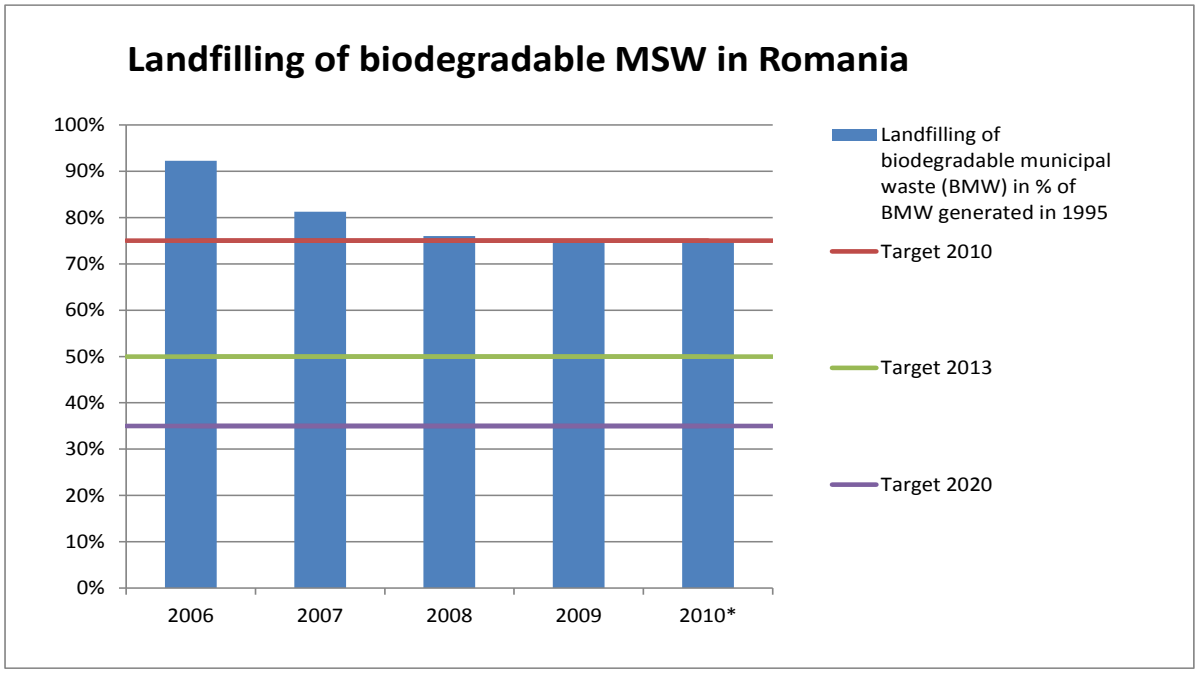
In Figure 2.3 the amount of BMW which was landfilled in 2010 was estimated by subtracting the increase in the amount of MSW going to composting and digestion treatment (Eurostat, 2012) from

2009 to 2010 from the quantities of BMW being landfilled in 2009. The estimated amount of BMW landfilled was 75 % of the level in 1995.

Although the figures below indicate a decrease of BMW landfilled, it is important to note that there has been no actual decrease in the total quantity of MSW landfilled and no increase in recycling and incineration levels have been reported.

One possible explanation could be that the BMW generation has decreased to a large extent, but this explanation seems unlikely. The explanation might be linked (again) to the poor quality of data. Treatment of BMW in MBT plants might be another explanation, but the National Environmental Protection Agency of Romania has indicated that there are currently no functioning MBT plants in Romania.

Figure 2.3 Landfilling of biodegradable MSW in Romania



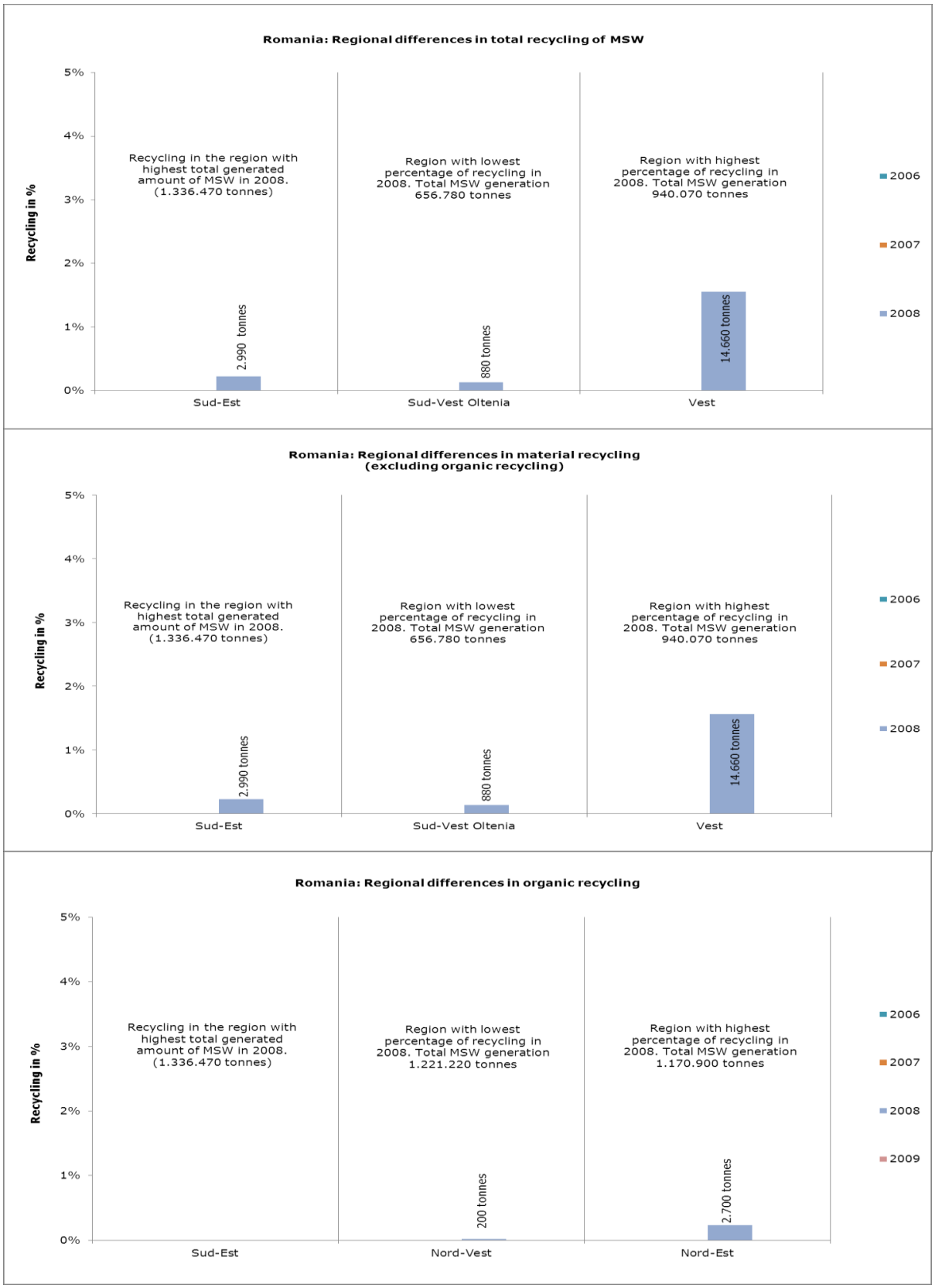
Source: EC, 2012 and CRI calculation.. The figures from 2009 are taken from the NEPA annual report 'State of the Environment' (2010).* The figures for 2010 are CRI estimations. The target dates take account of Romania's 4 years derogation period.

2.1.4 Regional differences of MSW recycling from 2001 to 2010

Figure 2.4 shows differences in regional recycling data for MSW which Romania has reported to Eurostat. The data presents the differences in MSW recycling rates for total recycling, material recycling and organic recycling in 2008. Each type of recycling is represented by three different regions:

1. Recycling in the region with the highest total generated MSW amount in 2008;
2. Recycling in the region with the lowest percentage of the respective type of recycling in 2008;
3. Recycling in the region with the highest percentage of the respective type of recycling in 2008.

Figure 2.4 Regional differences in recycling of MSW



Source: Eurostat regional data, 2012

The Romanian regions which identify with the above mentioned categories are the Sud-Est region, Sud-Vest Oltenia, the Vest region, the Nord-Vest and the Nord-Est regions.

As previously discussed, the recycling rates in Romania are very low, even zero in some parts of the country. In 2008 the Sud-Est region had the highest level of generated MSW with 1 336 470 tonnes. The Sud-Est region recycled 2 990 tonnes of this, all of which was material recycling. The highest recycling rate can be found in the Vest region. As with the Sud-Est region, all 14 600 tonnes of recycling was material recycling. This quantity was sufficient to mean that the Vest region has the highest material recycling rate but still at a very low level. The Sud-Vest Oltenia region has the lowest total MSW recycling rate and lowest material recycling rate; only 880 tonnes of MSW was recycled in 2008, all of which was material recycling.

There is no data available for the organic waste recycling levels in the Sud-Est region. The Nord-Vest region has the lowest percentage of organic waste recycling in 2008, recycling only 200 tonnes of organic waste of a total generation of 1 221 220 tonnes of MSW. The Nord-Est region recycled the highest percentage of organic waste; 2 700 tonnes of organic waste were recycled out of a total MSW generation of 1 170 900 tonnes 2008.

Differences in the regional recycling levels in Romania have been reported, but they are not substantial. The overall level of recycling is very low in all regions.

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

Romania currently does not have a landfill tax.

2.1.6 Environmental benefits of better MSW management

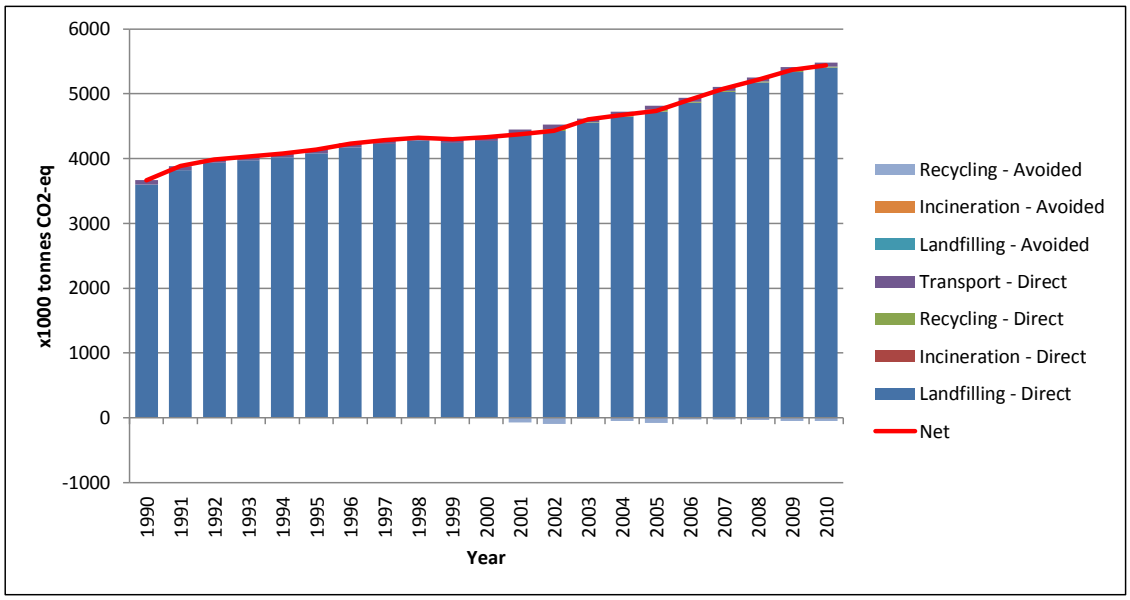
The environmental costs and benefits of the MSW management in Romania are indicated in figure 2.7 through greenhouse gas emission levels. The figure illustrates the evolution of direct emissions, avoided emissions and net emissions from 1990 to 2010.

The figure shows that the emissions from landfilling in Romania steadily increased over the years, with a slight stagnation in 1999 and 2000.

Even though starting from 2001, some GHG emissions have been avoided through recycling, these are too low to have an effect on the trend of the net green house gas emissions. Emissions from landfilling might increase for several years to come although a decrease of landfilling of MSW can be expected. This is because waste that is already landfilled will continue to emit considerable amounts of green house gas emissions.

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.

Figure 2.7 GHG emissions from MSW management in Romania[2]



2.2 Uncertainties in the reporting

Uncertainties or differences in the reporting of MSW can result in different recycling levels being presented. For Romania, such an example is the extent to which packaging waste from households and similar packaging from other sources is included in the reported recycling levels of MSW.

Figure 2.8 indicates to what extent Romania includes recycling of packaging waste in its reporting of recycling of MSW from 2001 to 2010.

As it can be seen in figure 2.8, the levels of recycled MSW in Romania are significantly lower than the levels of recycled packaging waste. In 2009, Romania reported to Eurostat 404 200 tonnes of recycled packaging waste of which approximately 87 000 tonnes was glass, 187 000 tonnes was paper and cardboard, 36 000 tonnes was metal and 70 000 tonnes was plastic (Eurostat, 2012). The same year, the amount of recycled MSW in Romania was 78 000 tonnes of which approximately 8 000 tonnes was glass, 27 000 tonnes paper and cardboard, 1000 tonnes was metals, 13 000 tonnes was PET and 7 000 tonnes other plastic (see table 2).

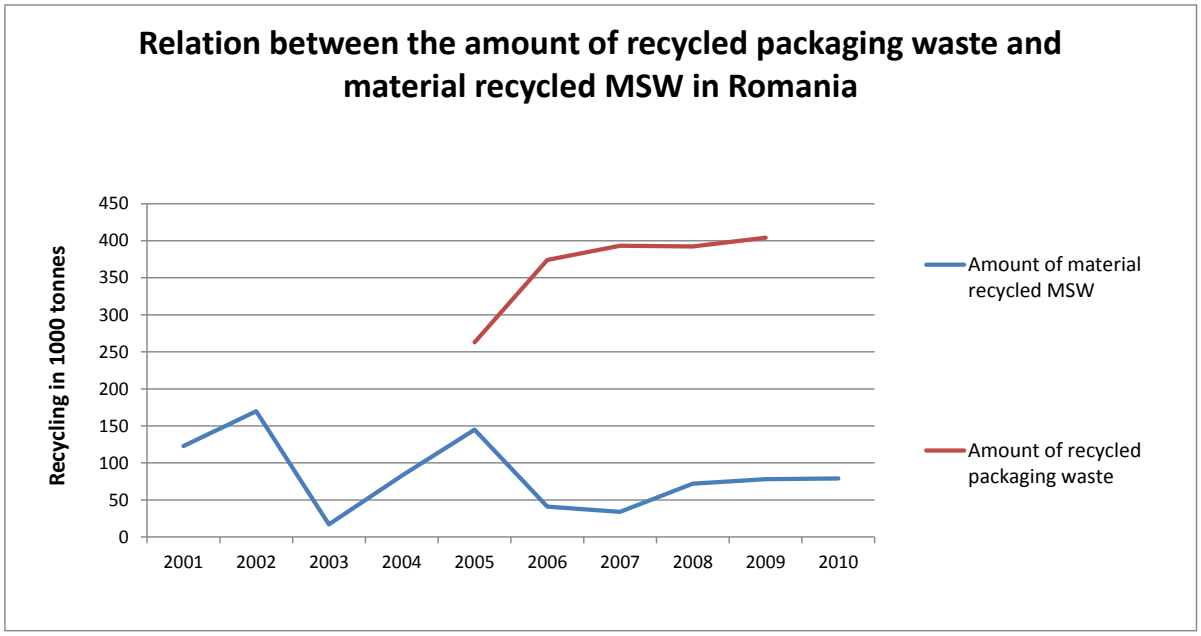
Most glass packaging waste is normally connected to private consumption. Therefore, it can be assumed that at least all the glass packaging waste recycled (87 000 tonnes) should be regarded as

[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 (IPCC, 2006) 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 electricity mix of Romania in 2009. 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 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, Romania updated the compositions of the landfilled and recycled MSW for 2008. The complete methodology is available from Bakas et al, (ETC/SCP, 2011).

MSW and not only the 8 000 tonnes reported. The difference (87 000 - 8 000 = 79 000 tonnes) could in fact be regarded as MSW recycled, increasing the total MSW recycled for Romania by 1.0%.

In the same way, larger parts of the other recycled packaging waste materials could possibly be regarded as recycled MSW. In other words, the very low level of MSW recycling in Romania is, for a certain although minor part, due to differences in reporting compared with other countries. This indicates that Romania does not report a relevant share of recycled packaging waste as MSW.

Figure 2.8 Comparison of packaging waste recycled and material MSW recycled



Source: Eurostat, 2012

2.3 Important initiatives taken to improve MSW management

In Romania, regulation for the management of MSW is in its early stages. Romania's accession to the European Union in 2007 has put the Romanian waste management under the regulative influence of various European Directives.

In Romania, the organisation of collection, transport and treatment of municipal waste is under the responsibility of the local public administration, who then decides to either place it under their own management or outsource to private operators. There are approximately 400 authorised operators for waste management services, with the largest 10 holding more than 80 % of the market share. The market is currently undergoing a consolidation process through mergers, market exits and take-overs (Larive, 2011). The market for selective waste collection services is also quite fragmented, with more than 1 000 companies having been licensed nationally for the collection of packaging waste. The paper/cardboard and metal waste management have by far the most efficient recovery and recycling systems (Larive, 2011).

In order to improve the situation, a number of objectives have been set for the years ahead, while several measures for their fulfilment have already been undertaken.

It is intended that 238 existing MSW landfills not in compliance with EU regulation are to be closed by 2013, and 65 compliant landfills/transfer stations are to be constructed, 50 of which with an average capacity of up to 100 000 tonnes/year and another 15 landfills with an average capacity of up to 50 000 tonnes/year (Atudorei, 2007).

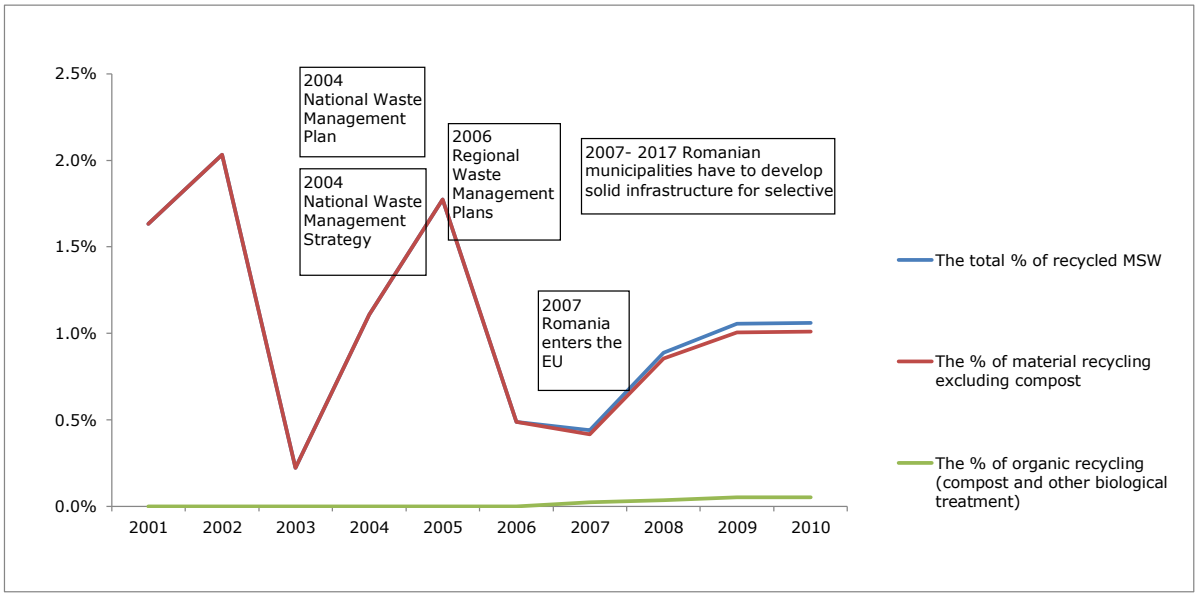
The steps which have been taken in Romania towards improving recycling levels have thus far been very tentative. In the near future, a total of EUR 6.8 million will be invested by the European Bank for Reconstruction and Development in the Green Group, an integrated recycling park in Romania. The remaining EUR 16.7 million needed for this project will come from the Global Finance's South East Europe Fund (Lever, 2012). The park will have four subdivisions responsible for collecting and recycling plastic, WEEE and fluorescent lamps (Business Insider, 2011).

Furthermore, Bucharest's City Council intends to implement a mandatory selective recycling and waste collection scheme in the capital region (Lever, 2012). The cleaning company Romprest is going to invest EUR 12 million in a system which will enable the selective collection, transport, and recycling of waste in Bucharest and the Ilfov county. According to Romprest, the new equipment will substantially improve the recycling level in the region, bringing it closer to the European targets (Romania Insider, 2012).

Incineration is considered to be too expensive for the waste management market in Romania. Even so, the plans for the integrated waste management system within the Bucuresti-Ilfov Region include the construction, in the coming years, of the first municipal waste incinerator in Romania. Interest in adopting such a technology has also been shown in the city of Brasov (Larive, 2011).

Co-incineration is well established in Romania since all cement kilns have invested in specific technology and have been authorised for the co-incineration of a wide range of waste fractions. It has been estimated that the co-incineration capacity in Romania and the potential demand for Refuse Derived Fuel (RDF) at the cement kilns is ten times higher than the currently available quantities. This represents an incentive within the sector to invest in the production of RDF and in selective collection (Larive, 2011).

Figure 2.9 Recycling of MSW in Romania and important policy initiatives



2.4 Future possible trends

Romania is one of the countries which fulfil the criteria stated in Article 11(3) of the EU Waste Framework Directive to receive a derogation period for the fulfilment of the 2020 target of 50% recycling of MSW. As illustrated in Figure 2.2, Romania will not fulfil this target if progress

continues at the current rate, therefore an exceptional yearly increase in the recycling rate is needed. Including some of the recycled packaging waste from MSW sources more systematically in the reported MSW recycled will also increase the recycling rate.

An exceptional effort from the regional and national Romanian authorities will be needed to increase the recycling level to 50 % by 2020. A similar effort will be required even with a five year derogation period to 2025. If success is to be achieved, there is a need for more detailed and concrete initiatives in the strategic documents which guide MSW management in the country. An important aspect which could lead to improved results is raising the level of awareness among citizens, who are not used to selectively collecting their waste, even though the infrastructure is already in place in some Romanian cities. However, further instruments will clearly be needed as well.

Approximately EUR 300 million from EU funding has already been assigned to improve MSW management in Romania, covering ten projects across ten counties. Applications for funding the remaining counties are in the preparation phase, with a total planned investment of EUR 730 million (Larive, 2011).

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