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Municipal waste management in the Czech Republic

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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

Main points regarding municipal waste (MSW) management in the Czech Republic:

- Around 70% of MSW generated in the Czech Republic is still landfilled;
- The MSW recycling rate steadily increased over the past decade from 1% to 16%;
- Municipalities are responsible for MSW management in their administrative territories;
- The Czech Republic has implemented a landfill tax. Citizens pay a fee for municipal waste services per capita;
- No strong correlation between raising of landfill taxes and drop in the amount of landfilled MSW, whereas there is good correlation with MSW recycled;
- Huge efforts have to be undertaken to fulfill the EU targets on diversion of biodegradable MSW landfilled by 2013 and 2020;
- According to present trends, it will require a significant effort in the Czech Republic to fulfil the EU 50% recycling target by 2020.

1 Introduction

1.1 Objective

Based on historical MSW data for the Czech Republic 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 The Czech Republic's MSW management performance

The report is based on the official figures reported to Eurostat. However, the Czech Ministry of Environment publishes data differing from the figures reported to Eurostat, and in those cases, the Ministry's figures have been indicated in the text when possible.

Waste management is a relatively young yet dynamically growing sector of the national economy in the Czech Republic. The first Waste Act was adopted in the Czech Republic as recently as 1991. Prior to 1991, handling of waste was subject to no legislative control or rules in the Czech Republic, and was not governed by any sectoral rules with the exception of so-called secondary raw materials (CZ, MoE, 2012).

The current Waste Act was adopted in 2001. It emphasises waste prevention, defines the hierarchy of waste handling, and promotes the fundamental principles of environmental and health protection in waste handling.

The main strategic document governing waste management is the Waste Management Plan of the Czech Republic. The current waste management plan was adopted in 2003, and covers a 10 year period (2003 – 2013).

Development of the new Waste Management Plan of the Czech Republic for the period 2013–2022 is now in progress. The draft version of this document was introduced at the Council of Waste Management meeting on 26 September 2012. A final version will be available in 2013 (CZ, NRC, 2012).

Among the recent achievements in municipal waste management in the Czech Republic are (BIPRO, 2012):

- 100 % collection coverage;
- EU legal requirements are well implemented in national waste legislation;
- Considerable recycling rate; increase of recycling from 11% in 2007 to more than 16% in 2010;
- Sufficient treatment capacity available (landfill, incineration);
- Landfill tax is implemented;

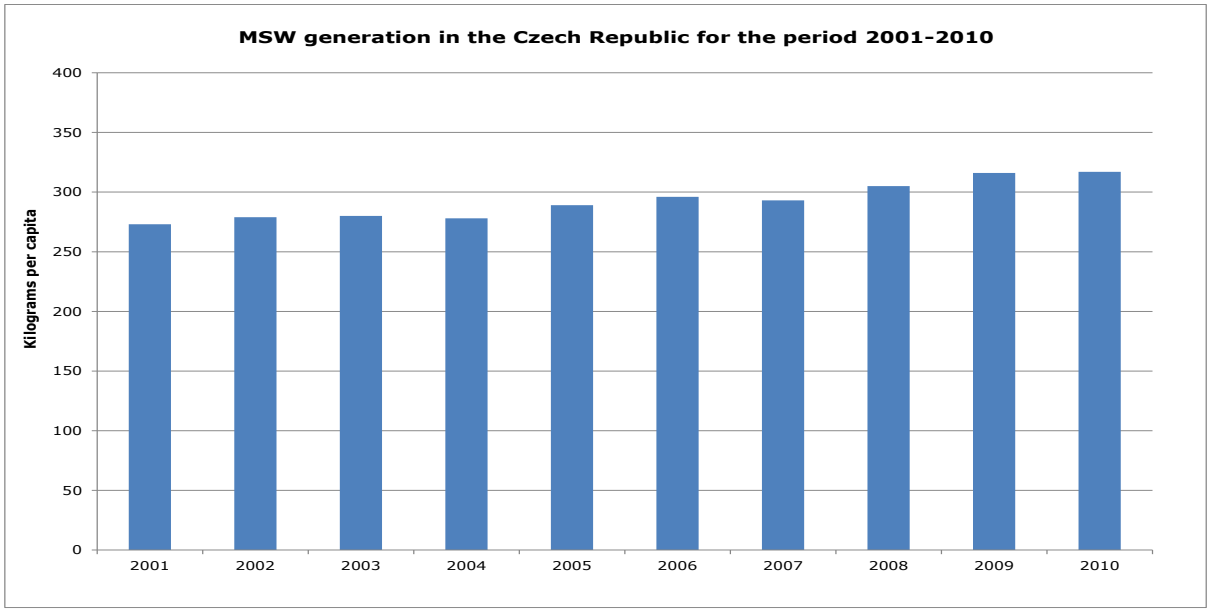
- Landfills are compliant with the requirements of the Landfill Directive;
- Incentive systems to favour prevention and separate collection (PAYT schemes) are in place in some parts of the country;
- Progress in bio-waste collection and treatment;
- The Czech government provides documents and guidelines for basic characterization of waste, training of regional authorities and regular meetings with central authorities and performs evaluation of waste management on a yearly basis;
- Several initiatives launched by Government to improve waste management (i.e. on packaging waste, awareness raising via workshops, exhibitions addressing the public, promotion of reuse of packaging (e.g. carrier bags, beverage packaging);
- General environmental awareness of the public and consumers exists, but their behaviour needs to be strengthened with regard to waste management.

In 2010, the total amount of municipal waste generated in the Czech Republic was 3 334 000 tonnes, or 317 kg per capita (Eurostat, 2012). However, according to the draft version of the Waste Management Plan of the Czech Republic 2013-2022, the total amount of municipal waste generated in the Czech Republic in 2010 was 4 633 791 tonnes or 441 kg per capita, and the rate of recycling of municipal waste was 19 % (CZ, NRC, 2012).

2.1 MSW Indicators

Figure 2.0 shows the development of MSW generation per capita in the Czech Republic from 2001 to 2010. It shows that the amount of generated MSW has increased slightly during the whole period from 273 kg per capita in 2001 to 317 kg per capita in 2010.

Figure 2.0 MSW generations per capita in the Czech Republic



Source: Eurostat, 2012

The majority of municipal waste in the Czech Republic is still landfilled. This is primarily because landfill is cheaper than other waste treatment options (ETC/SCP, 2012). Another factor is that there is insufficient capacity to recycle bio-waste (BIPRO, 2012).

Most of the sorted municipal waste is being recycled (glass, plastics, paper), (EEA, 2010).

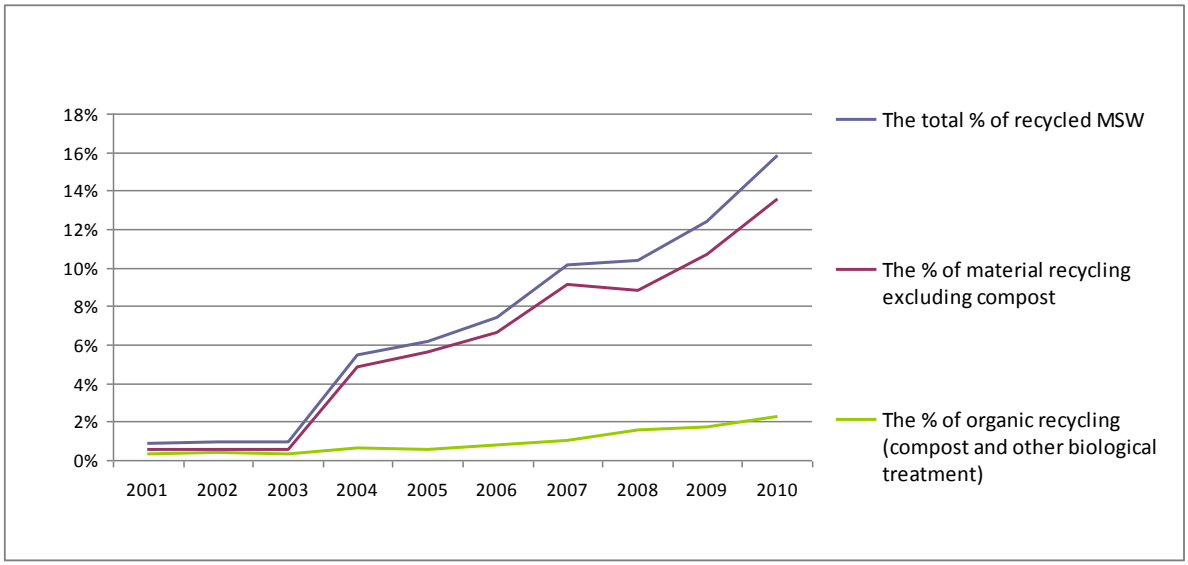
2.1.1 The recycling of MSW from 2001 to 2010

Figure 2.1 shows the development of MSW recycling in the Czech Republic related to total recycling, material recycling and organic recycling (composting and other biological treatment). After 2003 there was a positive trend in the recycling of MSW. The total percentage of recycled MSW increased from 1 % in 2003 to 16 % in 2010. In absolute amounts, this was an increase from 26 000 tonnes in 2003 to 528 000 tonnes in 2010. This large increase is equal to a yearly increase rate of more than two percentage points.

The total increase of recycling is mostly linked to material recycling, which has increased from 5 % (138 000 tonnes in absolute amounts) in 2004 to 14 % (452 000 tonnes) in 2010.

In the same period, organic recycling has had an almost negligible increase of only 1 percentage point, from 1% in 2004 to 2% in 2010.

Figure 2.1 Recycling of MSW in the Czech Republic



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

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

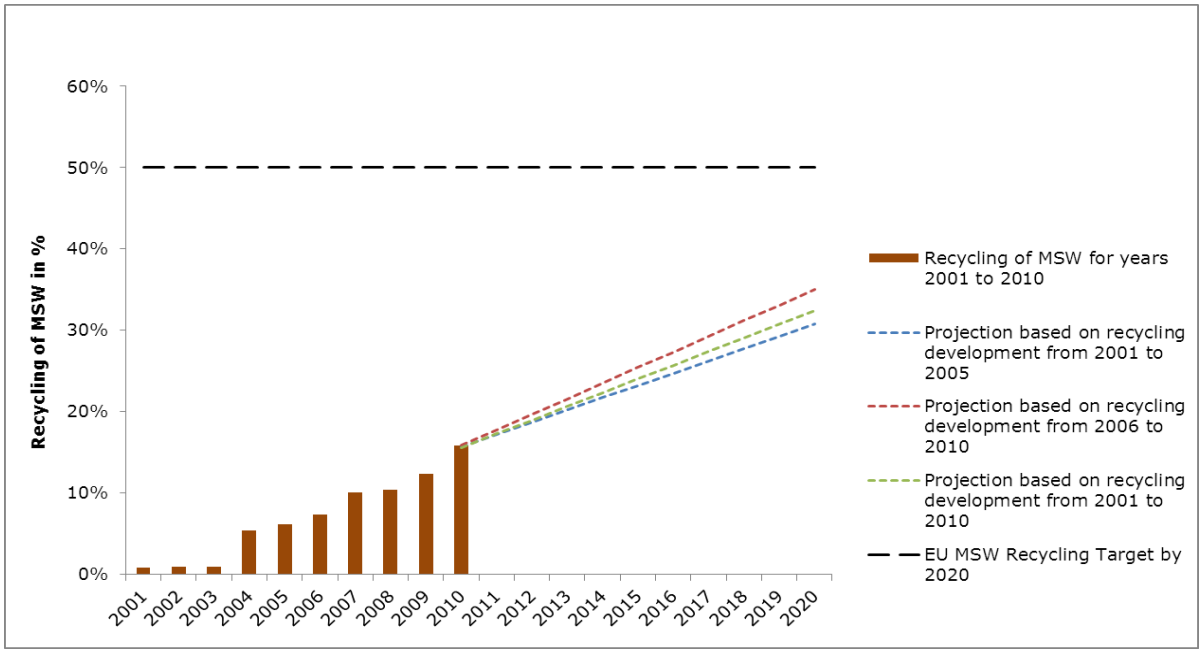
2.1.2 The yearly increase rate of recycling of MSW

Three scenarios have been calculated in order to assess the prospects for the Czech Republic to meet the 50 % recycling target as set out in the Waste Framework Directive1. 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 updated Waste Framework Directive in 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).

Figure 2 shows that if the increase rate for recycling of the last five years can be maintained, then the recycling rate would reach 35 % in 2020, which is considerably below the 50% target set in the EU legislation for 2020. Therefore, it will require a significant effort in the Czech Republic to fulfil the recycling of 50 % by 2020.

Figure 2.2 Future recycling of MSW in the Czech Republic



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

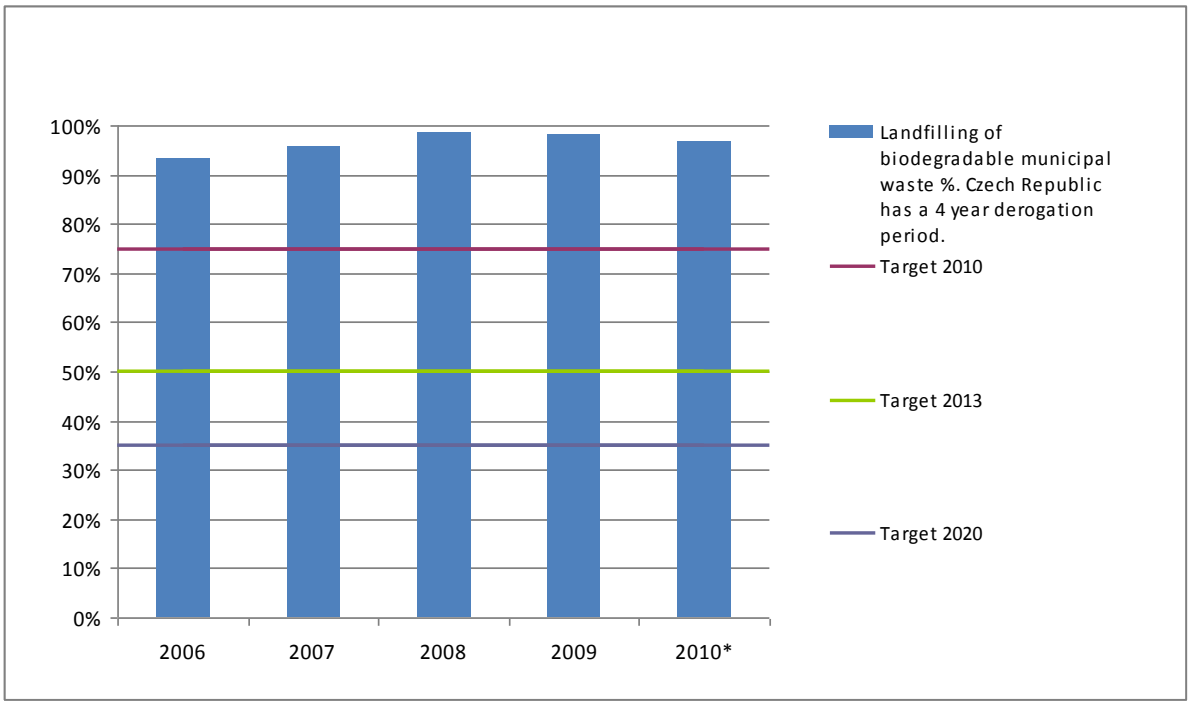
It has to be kept in mind that these three scenarios are very simplistic and do not take into account any planned policy measures. In addition, they are based on one calculation methodology for recycling of municipal waste (MSW recycled/MSW generated, using data reported to Eurostat) whereas countries 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 providing a rough indication and assessment of the risk of missing the target.

2.1.3 Landfilling of biodegradable municipal waste

According to the EU Landfill Directive, EU 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, the Czech Republic has been granted a derogation period of four years. In 1995, the Czech Republic generated 1 530 000 tonnes of BMW.

In 2006, the landfilled amount of BMW was 1 426 000 tonnes i.e. 93 % of the quantity generated in 1995. At the same time, the target of the Landfill Directive was 75 %. Taking into consideration the four year derogation period, the 75 % target was postponed for 2010. But it is estimated by the ETC/SCP that in 2010 the amount of landfilled BMW had increased to 1 483 000 tonnes, i.e. 97 % of the quantity generated in 1995. Based on the estimate,, even with derogation of four years, the target value of 75 % does not seem to have been achieved.

Figure 2.3 Landfilling of biodegradable MSW in the Czech Republic



Source: EC, 2012 and CRI calculation* Data for 2010 are missing. The amount of biodegradable MSW is calculated by subtracting the increase in amount of MSW composted from 2009 to 2010 from the amounts of BMW being landfilled in 2009. The target dates take account of the Czech Republic's 4 years derogation period.

The figure also indicates that a huge effort has to be undertaken in the Czech Republic to fulfil the 50 % target by 2013 and the 35 % target by 2020.

2.1.4 Regional differences of MSW recycling from 2001 to 2010

The Czech Republic has not reported regional MSW recycling data to Eurostat; only generation of MSW is reported on regional level.

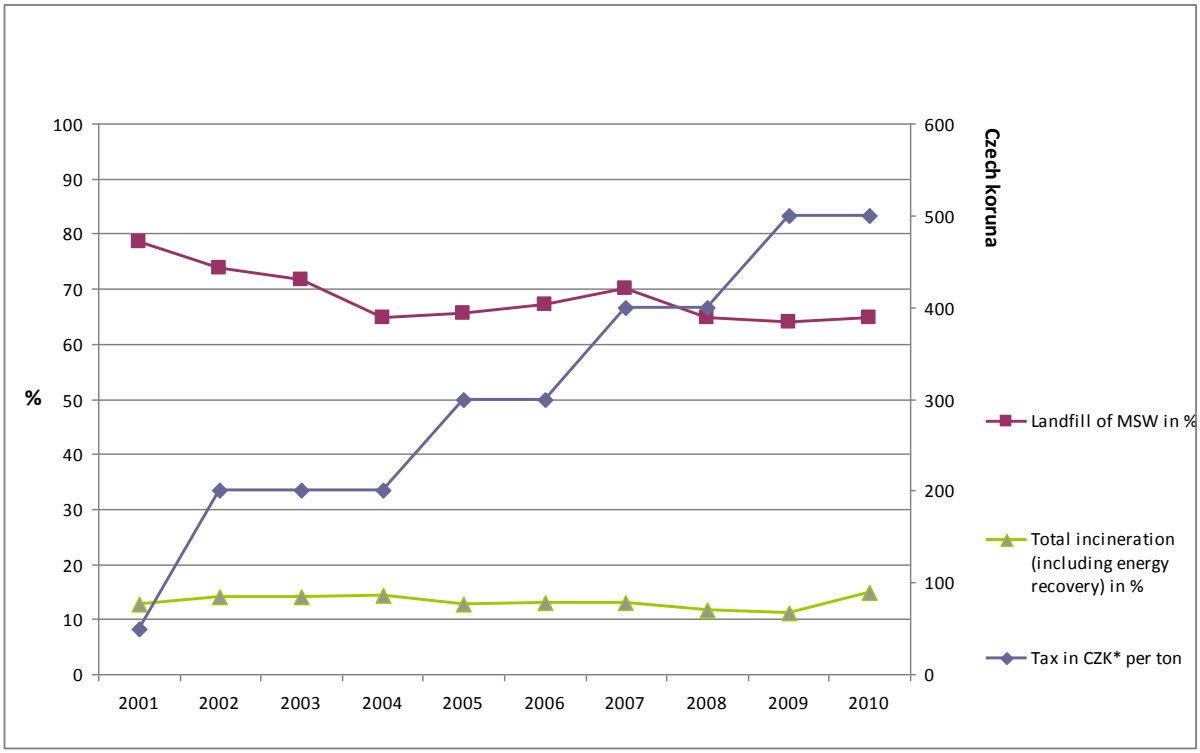
2.1.5 The relation between landfill tax level and recycling level of MSW

A landfill tax was established in 1992 (ETC/SCP, 2012).

Since 1998, the charge for all landfills has consisted of two components: 1) a basic charge (paid for municipal, other and hazardous waste) and 2) a risk charge (paid only for hazardous waste). The level of both components of the charge grows progressively, in particular for hazardous waste, so that waste generators are stimulated to limit the generation of waste and introduce different technologies, and use inputs of raw materials that do not generate hazardous wastes (ETC/SCP, 2012).

The landfill tax (basic charge) for municipal waste in 2011 was 500 CZK (EUR 20) per tonne (ETC/SCP, 2012).

Figure 2.5 Development of landfilling and incineration of MSW and landfill tax in the Czech Republic



Source: ETC/SCP, 2012 and Eurostat, 2012. * 1 € = 24,590 Czech koruna (2011 annual average currency exchange rate)

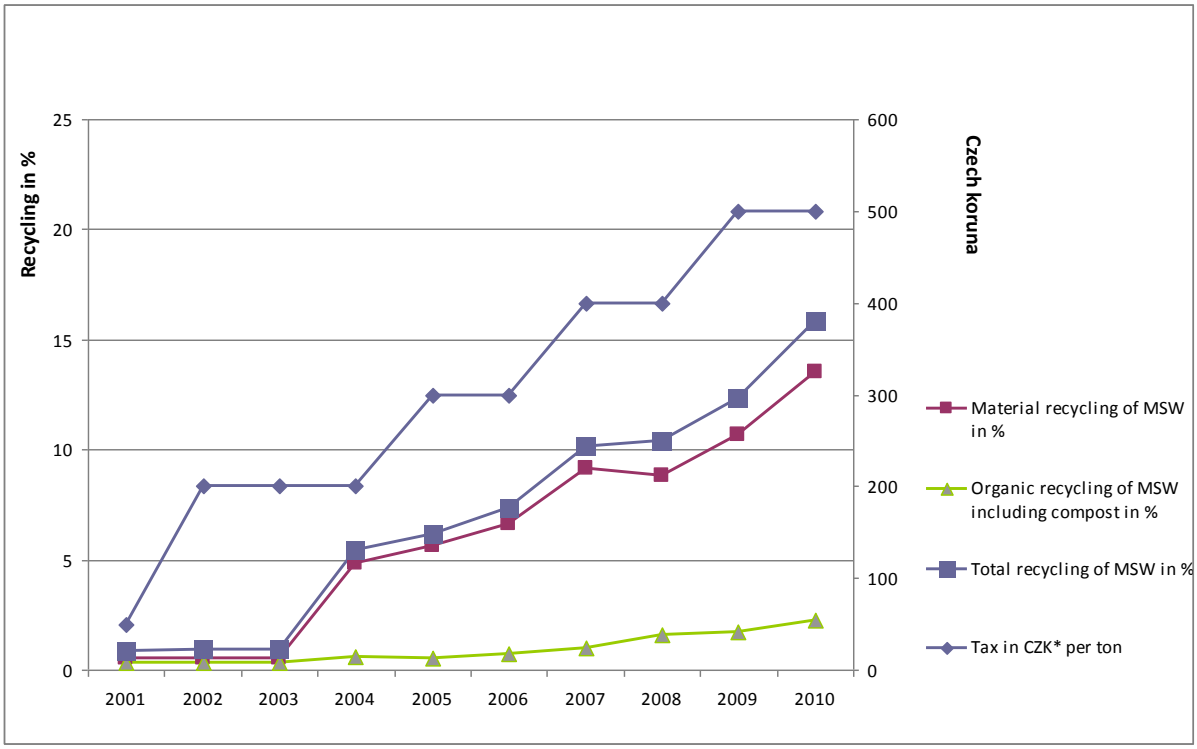
Figure 2.5 shows that in the case of the Czech Republic there is no strong correlation between raising landfill tax and drop in the amount of landfilled MSW. In the period from 2001 to 2010, the tax was raised tenfold while the amount of landfilled MSW decreased only by 15 %. In addition, the landfill tax seems to have had limited impact on incineration of MSW. Although the tax was raised considerably, the fluctuation of the percentage of total incineration was very small. The incinerated amount of MSW increased from 12.8 % in 2001 to 14.9 % in 2010.

Landfilling is still the predominant waste treatment path for MSW in the Czech Republic. The main reason is that it is economically more attractive, as landfilling is still much cheaper than recycling or incineration. There is also an insufficient capacity for other forms of waste management, although capacities for other forms of waste management have gradually been built up in recent years, sometimes with the help of EU subsidies (ETC/SCP, 2012).

The creation of more waste processing facilities, and the subsequent change in technological and economical conditions, can potentially offer an alternative that can compete with landfilling. According to an economic model of MSW 2010 (Model of cost and price relationships for municipal waste management of the Czech Republic) developed by Czech experts, the average cost difference between landfilling and more preferable waste management (e.g. recycling) is only at the level of hundreds of CZK per ton (CZ, NRC, 2012). There is a possibility to balance these costs via charges in the coming Waste Management Act, currently under preparation. This would require the charges for landfilling to again be gradually increased in order to bridge the difference in average costs compared to more beneficial waste management options (ETC/SCP, 2012).

However, Figure 2.6 shows that the increase of the landfill tax is reflected in an increase of total recycling of MSW (from 0.9 % in 2001 to 15.8 % in 2010). The increase in total recycling of MSW is mostly linked to material recycling of MSW and to a lesser extent to organic recycling.

Figure 2.6 Development of MSW recycling and landfill tax in the Czech Republic



Source: ETC/SCP, 2012 and Eurostat, 2012. * 1 € = 24,590 Czech koruna (2011 annual average currency exchange rate)

Individual households pay charges/fees for municipal waste collection. The design of the fee has historically had an undesirable influence on the behaviour of households. As the amount of the annual fee per household was dependent on the amount of waste (or rather the number of collections of a household's garbage container per year and the volume of the container), the amount of illegal littering was rather high, and the competent authorities were not always able to find the original waste generators to penalize them (ETC/SCP, 2012).

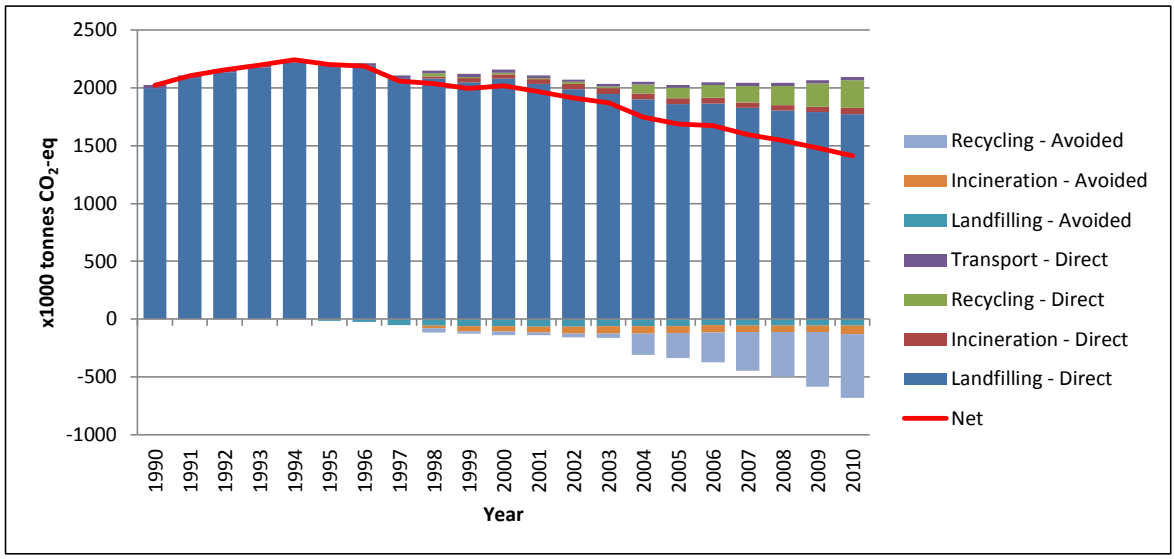
There are three ways to pay for municipal waste (BIPRO, 2012).:

- First; the local fee for the operation of a system of collection, transport, separation, recovery and disposal of municipal waste is limited by a maximum of CZK 500 (about EUR 20) per inhabitant per year;
- Second; an amendment to the Act on Wastes, No. 275/2002 introduced an optional fee for municipal waste; the amount of this fee is not specified. This article enables municipal authorities to use PAYT system;
- Third; pursuant to the Act on Wastes, payment can be made on a contractual basis between the municipality and the inhabitant; again, there is no upper limit for this payment.

2.1.6 Environmental benefits of better MSW management

Figure 2.7 shows the development of GHG emissions from MSW management calculated 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 the Czech Republic[2]



Results presented in figure 2.7 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.

As shown in Figure 2.7, net emissions increased up until 1994, and have constantly decreased there after. There has been no considerable change in direct emissions from landfilling in the observed period apart from a slight constant decrease since 2000. It is reasonable to assume that direct emissions from landfilling will remain constant for several years to come because BMW landfilled in previous periods will continue to emit considerable amounts of GHG.

There has been a constant increase of avoided emissions since 2004. This increase is mainly linked to recycling-avoided emissions, while incineration-avoided and landfilling-avoided emissions have barely changed.

Increased recycling of MSW may result in reduced GHG emissions. This is because products based on virgin material generally generate more emissions throughout their life-cycle than those which are based on recyclables.

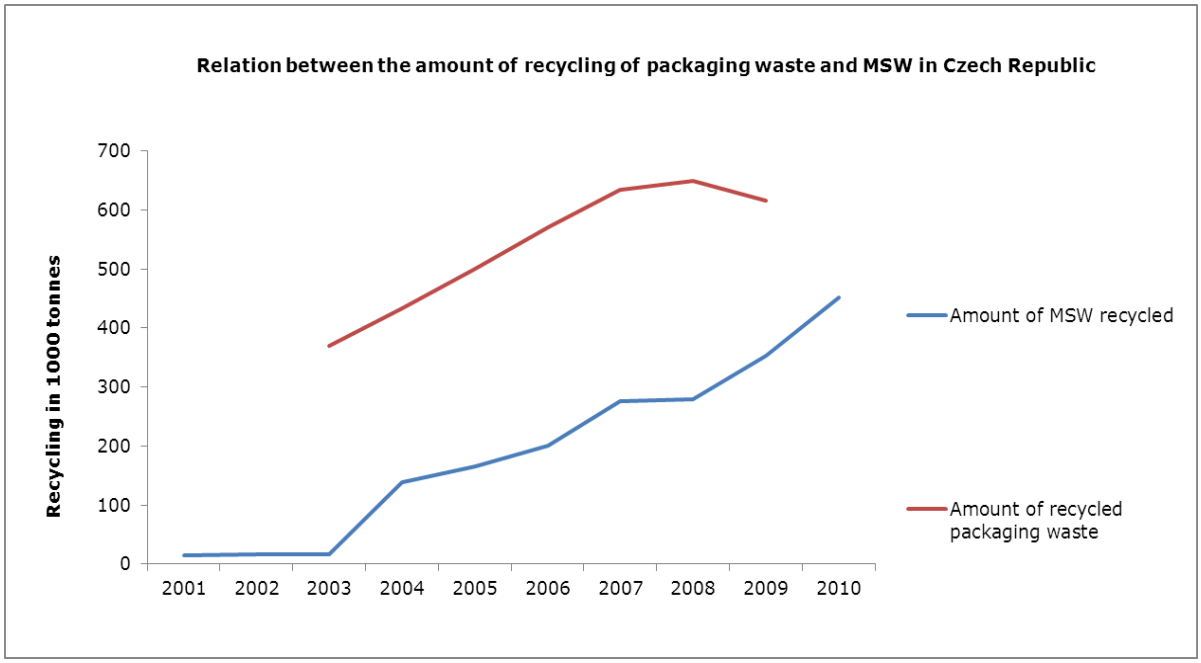
2.2 Uncertainties in the reporting

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 the Czech Republic is to what extent packaging waste from households and similar packaging from other

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 electricity mix of the Czech Republic in 2009 based on IEA data. Processes generating heat are assumed to substitute average heat mix for the EU-25 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, Czech Republic updated the composition of the recycled MSW for 2009. The complete methodology is available from Bakas et al. (ETC/SCP, 2011).

sources is included in the reported recycling of MSW. Most member countries, including the Czech Republic, have producer responsibility schemes on packaging waste. Private operators of these schemes do not always report on the sources of the recycled packaging waste, and therefore packaging waste is not always reported to Eurostat as MSW.

Figure 2.8 Comparison of packaging waste recycled and material MSW recycled



Source: Eurostat, 2012.

Figure 2.8 shows that the amount of recycled MSW in the Czech Republic was significantly lower than the amount of recycled packaging waste, which may indicate that the Czech Republic has not included very much packaging waste from households and similar packaging from other sources in its reporting of recycling of MSW to Eurostat.

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 subsequently sent to landfill or incineration. However, there are no MBT plants installed in the Czech Republic so far (CZ, NRC, 2012).

2.3 Important initiatives taken to improve MSW management

The goals and targets for the various waste treatment methods and the optimum ways of achieving them are set out by the Waste Management Plan of the Czech Republic for 2003-2013. Regional waste management plans and the waste management plans of waste producers in the entire country must comply with the Waste Management Plan of the Czech Republic.

Fourteen regional WMPs are available for the period 2004-2014 (BIPRO, 2012).

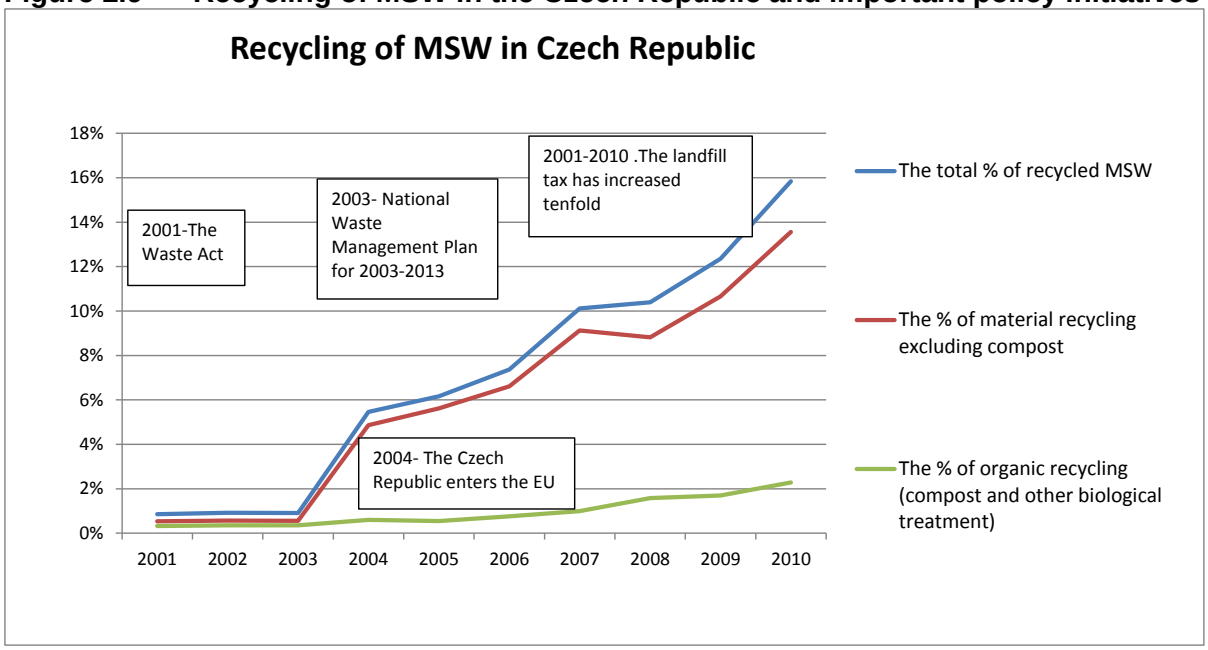
The Council of Waste Management has been established as one of the advisory boards to the Environment Minister. It includes representatives from the Czech Republic Waste Management Board, the counties, leading experts from all government departments as well as the non-governmental sector (universities, professional associations), (BIPRO, 2012).

School activities (including a website for children, i.e. www.tonda-obal.cz) and public training for municipalities, towns and cities have also been undertaken, together with an advice service for municipalities on optimising the separate collection of household waste (BIPRO, 2012).

Regions and municipalities have to draw up Waste Management Plans in compliance with the WMP of the Czech Republic. Waste producers that generate more than 1 000 tonnes of non-hazardous waste or more than 10 tonnes of hazardous waste per year must also draw up WMPs. These must comply with the WMP from 2013 on (due to waste act amendment). The national and regional WMPs include a strategy for the reduction of biodegradable waste going to landfills (BIPRO, 2012). This strategy is being gradually implemented in connection with the requirements contained in the Czech WMP and the objectives of the EU Landfill Directive. Quality standards on composted bio-waste are also in place (BIPRO, 2012).

Although there are no direct restrictions or a ban on the landfill of biodegradable and/or compostable waste, biodegradable and/or compostable waste can be landfilled only as a part of mixed municipal waste. Furthermore, there has been a discussion on the ban of untreated MSW (BIPRO, 2012).

Figure 2.9 Recycling of MSW in the Czech Republic and important policy initiatives



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

2.4 Future possible trends

As indicated in Figure 2.2, it will require significant efforts to obtain a very high yearly increase of recycling of MSW from 2010 to 2020 if the Czech Republic is to fulfil the EU-target of 50 % recycling by 2020.

It is possible that of the MSW recycling rate can be increased by including some of the recycling of packaging waste from MSW sources more systematically in the reporting of recycling of MSW.

The outlook for 2020 will be influenced by a new waste management plan. The main targets of the current waste management plan are (EEA, 2010):

- To minimise the volume and weight of products while retaining their functional properties;

- To create conditions to support returnable, reusable packaging;
- To provide for the recovery of 38 % by weight of the annual amount of oil sold by 2006 and 50 % of the annual amount of oil sold by 2012 and increase the amount of waste oil collected for recycling;
- To provide for the collection and material recovery of 95 % by weight of the total amount of lead storage batteries sold by 2012;
- To reuse and recover at least 95 % of the average weight of all discarded vehicles accepted for the calendar year and to reuse and recover materials equivalent to at least 85 % of the average weight of all discarded vehicles accepted for the calendar year by 1 January 2015 at the latest.

The Czech Ministry of the Environment is actually preparing a complex reform of the waste legislation (planned entry into force is 1 January 2014). This reform includes an amendment of the Packaging act, the elaboration of the new act on waste (for example the landfill tax will gradually increase – doubled in 2016 tripled in 2020) and new acts regarding WEEE, batteries, tires and ELV (BIPRO, 2012).

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