

# Municipal waste management in Croatia



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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.

**Disclaimer**

This ETC/SCP working paper has been subjected to European Environment Agency (EEA) member country review. Please note that the contents of the working paper do not necessarily reflect the views of the EEA.

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## Highlights

- Recycling of municipal waste has started recently but the recycling rate is still low at 4 %. The main challenge is to increase separate collection from municipal waste and to develop the infrastructure for recycling of municipal waste (e.g. waste management centres)
- The reported MSW recycling rates would be higher (and more realistic) if all recycled packaging waste from households was included in the reported MSW data.
- The establishment of the Environmental Protection Programmes and Energy Efficiency Fund in 2004 has been an important initiative to ensure additional resources for financing and monitoring projects and programmes for waste management
- Croatia would need to make an exceptional effort in order to fulfil the 50 % target of the Waste Framework Directive by 2020 as well as the diversion targets of the EU Landfill Directive. The increase in BMW since 1997 – the reference year for the diversion targets of the Landfill Directive for Croatia – makes it very difficult for Croatia to meet the BMW targets.

# 1 Introduction

## 1.1 Objective

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

Croatia will become a member of the EU on 1 July 2013. Croatia is highly advanced in its transposition of the acquis in the waste sector. Croatia has continued alignment with the new Framework Directive on Waste 2008/98/EC (EU, 2010). The transposition of the acquis in the area of waste management into the Croatian legislation has been completed with the exception of the Waste Framework Directive (2008/98) (ETC/SCP, 2011). The current Waste Act which came into force in 2004 and its amendments are in the process of revision with the purpose of harmonization with WFD 2008/98. It is expected that the WFD 2008/98 will be transposed by the end of 2012 (CEA, 2012a).

The first waste act in Croatia was adopted in 1995 and has since then been amended a number of times (CEA, 2012a). The two main policy documents focusing on the national level are the Waste Management Strategy from 2005 and the Waste Management Plan from 2007 (ETC/SCP, 2011).

The Waste Management Strategy assesses the situation, identifies the problems and obstacles, and establishes the framework for waste reduction and sustainable waste management. The Waste Management Strategy is being implemented through a Waste Management Plan 2007-2015 which serves as a framework document for waste management plans of the counties and for elaboration of individual projects that fit into the county/regional integrated waste management system. The concept of the Plan is based on the waste management hierarchy which gives priority to waste prevention, recycling, reuse and other types of recovery (Government, 2007; EEA, 2011).

### 2.1 MSW Indicators

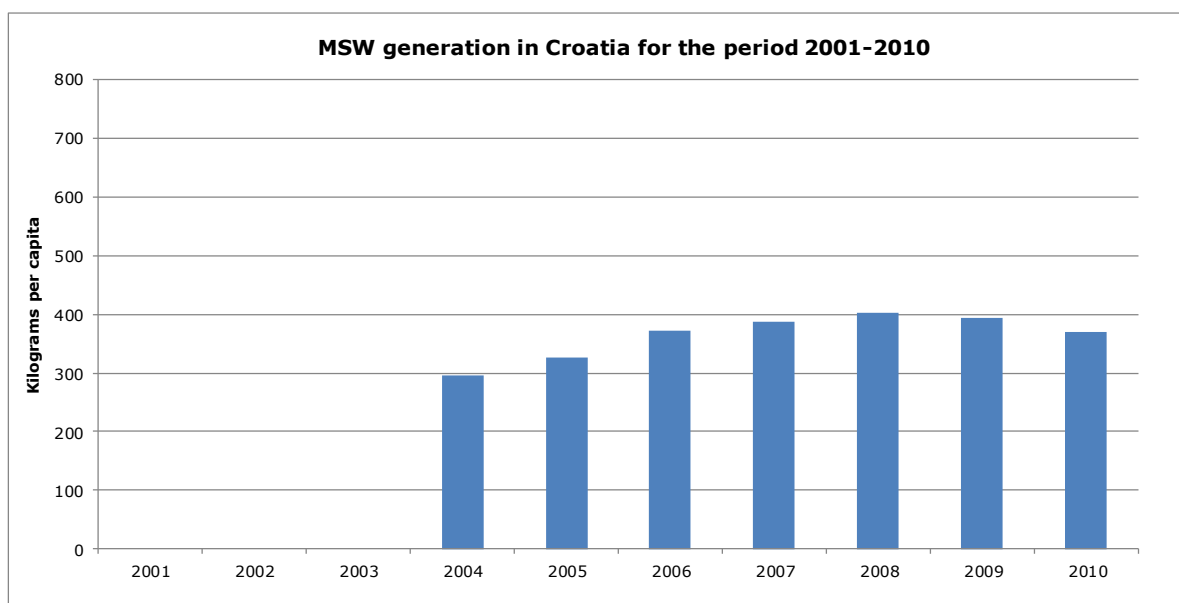
Coverage of population and municipalities by organised municipal waste collection increased from 86 % in 2004 to 96 % in 2010, which fulfilled the quantitative target for 2015 (90 %) set by the Waste Management Strategy of Croatia (EEA, 2010; CEA, 2012a).

The generation of MSW in Croatia has increased from 979 000 tonnes in 1995 to 1 630 000 tonnes in 2010. The level of MSW peaked in 2008 with 1 788 000 tonnes (Eurostat, 2010; CEA, 2011a).

Figure 2.0 shows the development of MSW generation per capita in Croatia from 2004 to 2010. There has been an increase in the period from 295 kg MSW per capita in 2004 to 369 kg MSW per capita in 2010. The amount peaked with 403 kg MSW per capita in 2008.

Data on produced municipal waste until 2005 were estimated. From 2006 onwards, data on the produced amounts of municipal waste was determined by combining data reported by municipal waste collectors with estimations for municipalities for which data were not reported. Since 2008, quantities have decreased partly because of the economic crisis and partly because of the improvement of the data quality due to introduction of weighing at an increasing number of landfills. So, data reported by MSW collectors were less estimated and therefore less overestimated (CEA, 2012a).

**Figure 2.0 MSW generation per capita in Croatia**



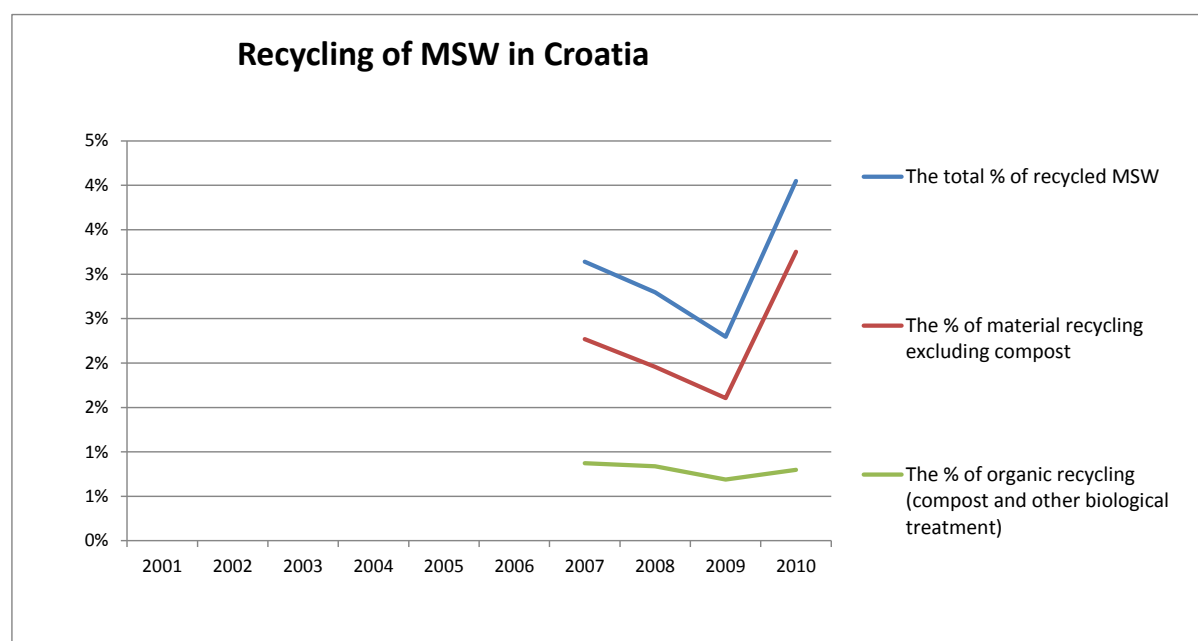
Most of the municipal waste is landfilled. Out of a total of 1 629 915 tonnes of municipal waste in 2010, 86 % was mixed municipal waste (1 401 959 tonnes). The amount of separately collected types of municipal waste is continually growing and in 2010 it accounted for 14 % (227 651 tonnes). However only part of this quantity ends up being recovered while the rest is landfilled (EEA, 2010, CEA, 2011a).

### 2.1.1 The recycling of MSW from 2001 to 2010

Figure 2.1 illustrates the recycling rate in Croatia from 2007 to 2010. The total recycling level is low and was around 4 % in 2010.

According to Eurostat data, the level of organic recycling is very low, only 1 % or 13 000 tonnes in 2010 and 12 487 tonnes in 2009. The material recycling is also low and was only 3 % or 53 000 tonnes in 2010 (CEA, 2012a).

**Figure 2.1 Recycling of MSW in Croatia**



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

The separately collected municipal waste consisted mainly of bulky waste (38 %), organic waste (20 %), and paper (8 %) in 2010 (CEA, 2012a). The separated collected municipal waste adds up to 227 651 tonnes in 2010. However, a large part of it was landfilled. Some landfill operators separate recyclables from municipal waste and forward them to recycling. Those quantities are not included in the reported amount of recycled waste due to the lack of reported data (CEA, 2012a).

The 4 % recycled waste includes only waste for which there is sound evidence that the recovery took place (this was requested for the purpose of reporting to Eurostat). For example, this figure does not include temporarily stored quantities at the exporters destined for recovery, usable components separated from municipal waste at landfills later submitted to recovery, for which landfill operators usually do not report data. Furthermore, some quantities are incorrectly reported as waste from businesses instead of municipal waste (which is the case for part of packaging paper waste for example) etc. Therefore, the recycling rate is at least 4 % (CEA, 2012a).

It is the future intention of the Croatian Environment Agency (CEA) to improve the quality of data reported by waste collectors and work on methods of calculation of the recycling rate, hopefully in close cooperation with Eurostat and EEA (CEA, 2012a).

Recycling of municipal waste is a new activity in Croatia and it takes time to get the infrastructure ready. The bottom line is that there is room for improvement of both material and organic recycling.

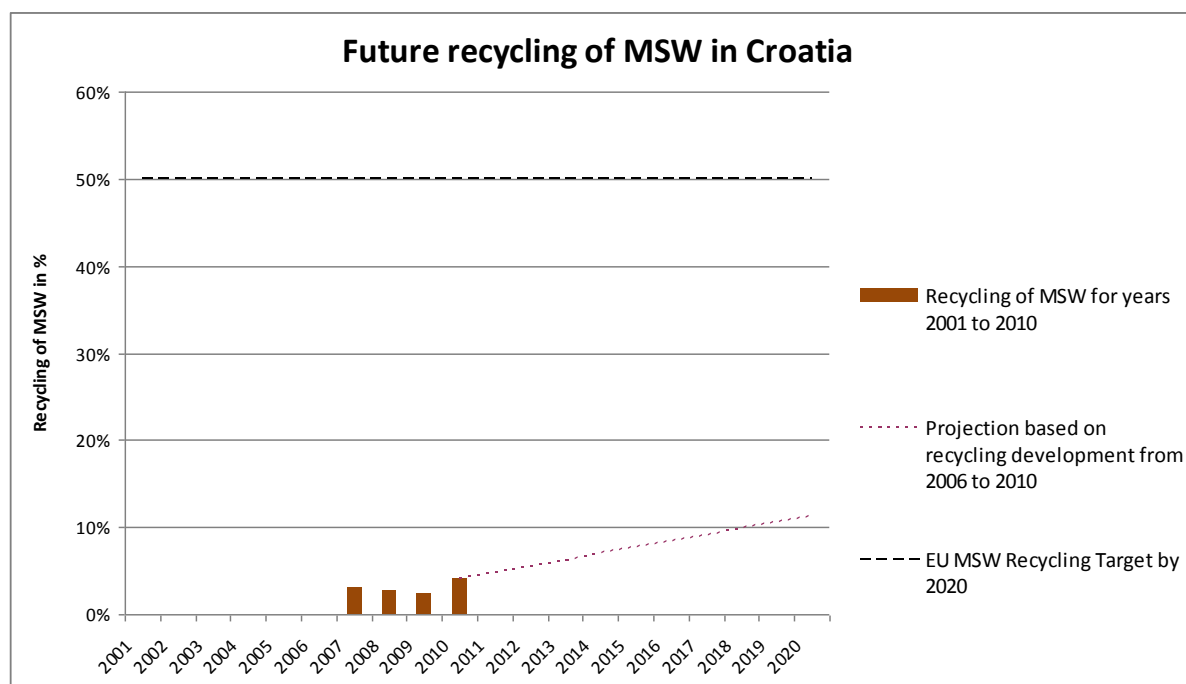
### **2.1.2 The yearly increase rate of recycling of MSW**

In order to assess the prospects for Croatia to meet the 50 % recycling target as set out in the Waste Framework Directive<sup>1</sup> a scenario has been calculated. Figure 2.2 focuses on how the recycling level of MSW would increase in Croatia until 2020 if the development trend continues. The trends are related to the increase rate based on a linear regression of the recycling rates from the years 2006 to 2010.

<sup>1</sup> 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).

As explained above, the recycling of municipal waste was reported for the first time in 2007. Figure 2.2 highlights the fact that according to the recycling trend from 2007 to 2010 and taking into consideration the low level of recycling of municipal waste from 2007 to 2010 (2-4 %), Croatia would need to make an exceptional effort in order to fulfil the 50 % target of the Waste Framework Directive by 2020.

**Figure 2.2 Future recycling of MSW in Croatia**



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

It has to be kept in mind that this scenario is very simplistic and does not take into account any planned policy measures. In addition, it is 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 scenario 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, EU member states have to reduce the amount of biodegradable municipal waste (BMW) landfilled by a certain percentage by 2006, 2009 and 2016, related to the amount of BMW generated in 1995. In the accession negotiations with the EU for enlargement to Croatia it was agreed to use 1997 as the base year for Croatia. The 75 % reduction target has to be fulfilled in 2013 and the 50 % target in 2016 (CEA, 2012b).

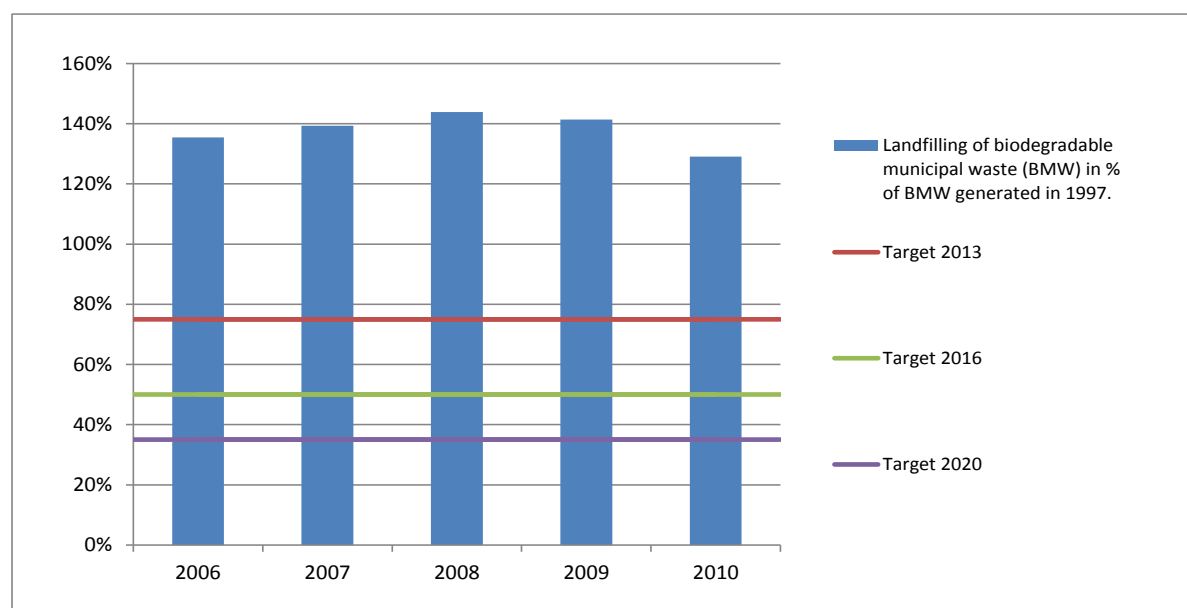
The indicator can be used to indicate whether there is development towards fulfilling these targets. Data used for figure 2.3 is national data for Croatia (EU, 2012; CEA, 2011b).

Figure 2.3 demonstrates the huge challenge which Croatia faces in order to reach the 2013 target to reduce BMW landfilled to 75% of BMW generated in 1997, mainly due to an increase of biodegradable municipal waste from 756 000 tonnes in 1997 to 1 012 651 tonnes in 2010. In 2010, 96 % was landfilled, 1.3 % composted while the rest (mainly paper and cardboard) was sent to other



recovery operations (CEA, 2012a). With the current development, however, it seems impossible to reach this target for Croatia in 2013.

**Figure 2.3 Landfilling of biodegradable MSW in Croatia.**



Source: EC, 2012 and CEA, 2011b. The target dates take account of Croatia's 4 years derogation period. The percentage is calculated based on biodegradable MSW generated in 1997

#### 2.1.4 Regional differences of MSW recycling from 2001 to 2010

No regional data for recycling of MSW in Croatia is included in Eurostat's database. Therefore, this indicator could not be applied to Croatia in this report.

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

Croatia has not introduced a landfill tax.

#### 2.1.6 Environmental benefits of better MSW management

The EEA-ETC/SCP model used for calculating the GHG emissions of MSW management does not include Croatia, however, the model will be extended to cover Croatia by the end of 2012. This indicator can thus currently not be applied to Croatia.

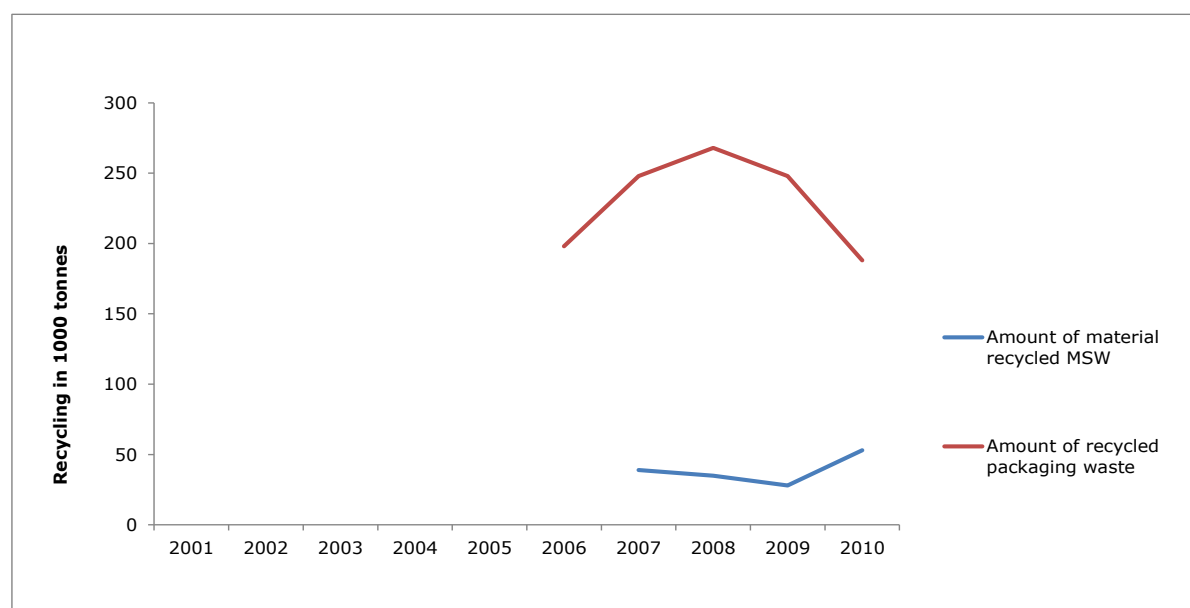
### 2.2 Uncertainties in the reporting

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 Croatia is the extent to which packaging waste from households and similar packaging from other sources is included in the reported recycling of MSW. Most Member States have producer responsibility schemes on packaging waste and therefore packaging waste is not always regarded or reported to Eurostat as MSW. Croatia has introduced a producer responsibility scheme on packaging waste. The importers and producers of packed goods have to pay a fee to the Environmental Protection Programmes and Energy Efficiency Fund (EPEEF). The EPEEF compensates municipalities and regions for expenses to collection, treatment or recovery for packaging waste (ETC/SCP, 2011; CEA, 2011a).

Figure 2.8 shows that the amount of recycled MSW in Croatia is significantly lower than the amount of recycled packaging waste from 2006 to 2010.

In 2010, the collection of packaging waste added up to 187 631 tonnes. The main part was paper and cardboard (124 476 tonnes) followed by glass (37 148 tonnes) and plastic (24 127 tonnes) (CEA, 2012a). A part of the collected packaging is collected in the business and service sector. However, some of the collected packaging waste is collected from households. Assuming that 50 % of the packaging waste is collected from households and could be added to municipal waste, the MSW recycling rate in 2010 would increase from 4 % to 10 %.

**Figure 2.8 Comparison of packaging waste recycled and material MSW recycled in Croatia from 2006 to 2010**



Source for data for packaging waste 2006- 2010: CEA, 2011a; and Eurostat, 2012

### 2.3 Important initiatives taken to improve MSW management

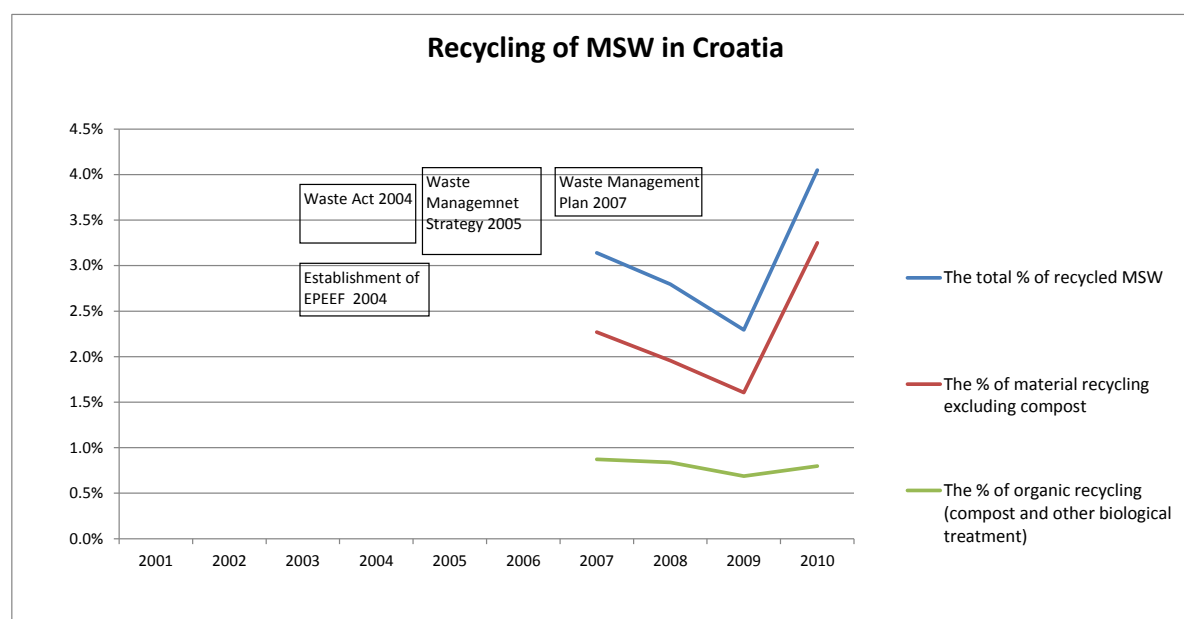
The adoption of the waste act in 2004, the waste management strategy from 2005 and the waste management plan from 2007 are all important initiatives taken in Croatia in the last ten years in order to improve municipal waste management.

Another important initiative in Croatia was the establishment of the Environmental Protection Programmes and Energy Efficiency Fund (EPEEF) in 2004. It is a fund established by a decision of the Government of Croatia in order to ensure additional resources for financing projects, programmes and similar undertakings in the field of preservation, sustainable use, protection and improvement of the environment (ETC/SCP, 2011).

Among other initiatives, it co-finances projects on waste prevention, projects for improving separate collection, re-use and recovery of certain waste types, remediation of landfills and building infrastructure (recovery and waste management centres) (ETC/SCP, 2011).

The EPEEF collects different environmental fees, which includes fees for burdening the environment with hazardous and non-hazardous industrial waste (ETC/SCP, 2011). Moreover, the EPEEF collects the fees from producers/importers of products within specific waste streams collection/recovery schemes such as waste oil, WEEE, waste tyres, packaging, batteries/accumulators, and ELVs. The EPEEF also compensates municipalities and regions for expenses to collection, treatment or recovery for the mentioned waste streams (ETC/SCP, 2011; CEA, 2011a).

**Figure 2.9 Recycling of MSW in Croatia and important policy initiatives**



## 2.4 Future possible trends

Croatia might fulfil the criteria stated in Article 11 (3) of the EU Waste Framework Directive in order to get a derogation period for fulfilling the 2020 target of 50 % recycling of MSW as the recycling of municipal waste in 2010 was 4 % (figure 2.1). As indicated in Figure 2.2 a fulfilment of the 50 % recycling target by 2020 would require extraordinary efforts. It would require an increase of the MSW recycling rate of at least 4.6 percentage points per year from 2010 to 2020. It is possible that part of the increase needed can be fulfilled by including some of the recycling of packaging waste from MSW sources systematically in the reporting of recycling of MSW, cf. section 2.2.

The national waste management strategy sets a target of 18 % for separate collected and recycled municipal waste in 2020 and 25 % in 2025 (EEA, 2010). In addition, it is planned to treat municipal waste by MBT plants and one incineration plant. The aim is to reduce landfilling to only residual waste (EEA, 2010; CEA, 2011a).

Under all circumstances, the necessary increase in recycling will require an exceptional effort from the Croatian government, the local authorities and a good co-operation between the public and private sector in order to secure sufficient treatment capacity.

A number of waste management centres are planned in counties or regions. The waste management centres are planned to be constructed before the end of 2018. They will be co-financed by EPEEF and other funds (CEA, 2011a).

Examples of finished projects: Funds for construction of the Bakarac County Waste Management Centre, Šibensko-Kinska County were provided with EUR 6 million from the ISPA (Instrument for Structural Policies for Pre-Accession) program.

The IPA Program had assigned EUR 24.5 million for construction of county waste centres in the Primorsko-Goranska, Istarska and Splitsko-Dalmatinska counties for the period 2007-2009 (EEA, 2010).

Construction has already started in three waste management centres and another three waste management centres are in the phase of preparing for construction. Locations are still to be identified for the other planned waste management centres (CEA, 2012a).

The City of Zagreb has planned a waste-to-energy incineration plant which should make a significant contribution, along with the planned mechanical and biological waste treatment plants, to reduce the landfilling of biodegradable waste by 2018-2020 (EEA, 2010).

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