

**EU policies and strategies for municipal waste management. Case study: South Moravia
region of the Czech Republic**

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Abstract: The current aim of EU policies and strategies is to turn Europe into a circular economy (Communication 2014/0398 final Towards a circular economy: a zero waste programme for Europe), boost recycling, secure access to raw materials and create jobs and economic growth. This aim includes also municipal waste management. The municipalities are the generators of the municipal solid waste (MSW) at local level and have the direct responsibility for physical treatment of waste on their territory. The Czech Republic prepares implementation of circular economy in waste management, where it will have to fulfil requirements of the Landfill Directive 1999/31/EC in 2020, which demand 65% diversion of bio-waste amounts from landfills compared to 1995 ones and the Waste Framework Directive 2008/98/EC requiring to reach 50% material recovery rate of recyclable municipal waste in 2020. The important role in the Czech Republic will be played by Public Administration authorities and the role of their Waste Management Plans (WMP). In the paper, we discuss and introduce how EU policies and strategies for municipal waste management are implemented in the South Moravia region of the Czech

Republic with the support of its WMP. Its analytical, mandatory and target parts are discussed together with their roles in the WMP, which will control MSW generation and treatment. Finally, the forecast of MSW generation for 2016 – 2025 is presented.

Introduction

Waste management (WM) 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, waste treatment 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. Legal rights and obligations are closely related to administrative tasks. The current *Waste Act* emphasises waste prevention, defines the hierarchy of waste handling, and promotes the fundamental principles of environmental and health protection in waste treatment, (MoE 2015a).

The Public Administration (PA) of the Czech Republic has vertical and horizontal structure. In terms of vertical as well as the entire PA is divided into the state and municipal administration, including the delimitation of competences and responsibilities.

From the perspective of horizontal is divided by the individual institutions of the PA in the area of waste management, corresponding with the territorial responsibility and hierarchies associated with it. The specific institutional framework of the WM is given by the powers and competencies of its various institutions, which to a large extent defines the law on waste. Regional authorities of PA are responsible for the performance of waste management. They also provide the methodological support for the municipalities and their local authorities, and to legislative standards proposed by the Ministry of the Environment (MoE), which is the central body of PA in the WM of the Czech Republic.

The municipalities are the generators of the municipal solid waste (MSW) at local level and have direct responsibility for physical treatment of waste on their territory. Each municipality creates the system for

the collection, separation, recycling, removal and disposal of waste, which is usually embedded in a municipal decree.

On 2 July 2014, the European Commission (EC) adopted a *legislative proposal*¹ and *annex* to review recycling and other waste-related targets in the EU Waste Framework Directive 2008/98/EC (WFD), the Landfill Directive 1999/31/EC (LD) and the Packaging and Packaging Waste Directive 94/62/EC (PPD). The aim of the proposal was to help turn Europe into a circular economy, boost recycling, secure access to raw materials and create jobs and economic growth. It does so by setting ambitious targets and adding key provisions on the instruments to achieve and to monitor them. The proposal was presented as part of the circular economy package (Communication 2014/0398 final Towards a circular economy: a zero waste programme for Europe). The main elements of the proposal include for municipal waste²:

- Recycling and preparing for re-use of municipal waste to be increased to 70 % by 2030;
- Recycling and preparing for re-use of packaging waste to be increased to 80 % by 2030, with material-specific targets set to gradually increase between 2020 and 2030 (to reach 90 % for paper by 2025 and 60% for plastics, 80% for wood, 90% of ferrous metal, aluminium and glass by the end of 2030);
- Phasing out landfilling by 2025 for recyclable (including plastics, paper, metals, glass and bio-waste) waste in non hazardous waste landfills – corresponding to a maximum landfilling rate of 25%.

The PA of the Czech Republic generally implemented current EU waste legislative (the WFD, the LD, the PPD, Directives 2000/53/EC on end-of-life vehicles, 2006/66/EC on batteries and accumulators and waste batteries and accumulators, and 2012/19/EU on waste electrical and electronic equipment including Communication 2014/0398 final) and wait for a final legislative proposal of the EC COM/2014/0397 final.

¹<http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52014PC0397>

²http://ec.europa.eu/environment/waste/target_review.htm

Currently, PA regional authorities of Czech counties are required by the *Waste Act* to make and approve in the form of generally binding decrees the authentic part of their *Waste Management Plans* (WMP). Their regional WMPs must be based on the Government Regulation of the WMP of the Czech Republic (MoE2015b) and above main elements of the proposal EC COM/2014/0397 final for municipal waste.

We focus to the implementation of EU policies and strategies for municipal solid waste (MSW) at regional level of the South Moravia province in the paper.

Materials and methods

The generation of MSW in the Czech Republic is stagnating around 5 M tons in the period 2009-2013. It reflects the average generation of MSW per capita value of 503,3 kg. Specifically, in 2013, this value reached 491,7 kg per capita and in the comparison with the year 2009 decreased 15,8 kg per capita. In particular, is positive the fact that since 2009 the generation decline is sustained the mixed municipal waste (MMW). The proportion of MMW in the total production of MSW amounts to 55,3%. From the point of view in 2012-2013, the production of MMW decreased by 2,5%. Between the years 2009 and 2013 have decreased MMW per capita of 40,9 kg. In 2013, MSW were landfilled (52,2%), material recycled (30,2%) and energy recovered (11,9%).

The Czech Republic has one of the lowest levels of municipal waste production in the EU28. Apart from the above-mentioned differences in definitions of the actual term “municipal waste”, the reasons for lower municipal waste production are also closely related to the population’s purchasing power, consumer behaviour and the frequency of consumer goods replacement which is lower in the Central and Eastern European countries than in the countries of Western Europe. In Western countries, the municipal waste production is rather stagnant, in some countries it grows while in the EU12, the trend is opposite.

Further, it is discussed the implementation of EU policies and strategies of MSW management into PA regional level, particularly to the South Moravia Region (SMR) of the Czech Republic.

Fig. 1 here

The SMR is situated in the South-Eastern part of the Czech Republic and belongs to the regions with significant economic potential. Gross domestic product per capita is one of the highest among regions of the Czech Republic. At a high level, is Moravian and agriculture – agricultural land accounts for 60% of the area of the SMR, which accounts for 84% of the arable land. A specialty of SMR is primarily viticulture at European level. A strong tradition here has the cultivation of fruit and vegetables. The northern area of the SMR is an important centre of forestry and timber production. Centre of the region is the statutory city of Brno, which is around 400 000 inhabitants, the second largest city in the Czech Republic.

We analysed the implementation of the past WMP of SMR (Hřebíček&Kalina 2015) in 2005-2013 and has proposed for PA authorities of the SMR main priorities to the new developed regional WMP of SMR for the period 2016-2025 (Hřebíček et al. 2015). The new WMP consists of three parts: *the analytical part* (it describes the current status and development of WM at the SMR from the point of generation and the treatment. It provides an overview of the technical and organisational solutions of WM including a description of the network WM facilities); *the mandatory part* (It lays down the basic principles for WM in the SMR, with an emphasis on respect for the waste treatment hierarchy. It establishes objectives, principles and measures, in particular, for selected groups of waste, which are of fundamental importance for the WM of the SMR in terms of its production, or properties) and *the target part* (It provides an overview of the tools for the fulfilment of the set WMP objectives. It deals with the system of

management of changes in WM. Part of it is a system of indicators, on the basis of continuously evaluates the WM and the implementation of the objectives of the mandatory part of WMP).

There were analysed, discussed and proposed the most important MSW priority in the WMP of SMR in the analytical part:

- a) Waste prevention and reducing the hazardous properties of the MSW;
- b) Reuse of product end-of life;
- c) High quality and maximum utilization of appropriate recycling MSW facilities (material, energy, biological) in particular collaboration with the surrounding regions;
- d) Optimize treatment of biodegradable municipal waste (BMW) on the territory of SMR, with an emphasis on mandatory introduction of separate collection BMW;
- e) The mandatory introduction of separate collection of at least for MSW from: paper, metal, plastic and glass by 2015;
- f) Energy recovery of MSW, particularly MMW;
- g) The fundamental limitations of the landfilling;
- h) Optimize all activities in MWMS with regard to the protection of human health and the environment;
- i) Optimization of all activities in municipal WM system, with regard to the costs incurred and the economic and social sustainability.

The total quantities of generated, material recycled, energy recovery and landfilling MSW in the period 2009-2013 shows Fig. 2. The main MSW treatment facilities show Fig. 3 with maps of landfills and Fig. 4 with map of energy recovery plants.

Fig. 2, Fig. 3 and Fig. 4 here

To achieve above priorities appropriate instruments and measures in the WMP 2015 – 2026 of the SMR were proposed in its mandatory part:

- 1) MSW prevention and reduction of MSW generation.
- 2) Minimization of adverse effects of MSW and municipal WM system on human health and the environment.
- 3) The sustainable development of society and the approach to the European “circular economy” in the SMR.
- 4) The maximum use of MSW as a substitute primary resources and transition on the circulatory economy.

The above goals for MSW will be reached in the SMR as follows:

- a) from 2015 to introduce at least for waste collection, recycling of paper, plastics, glass and metals in every municipality of the SMR and optimize the set of MSW collection sites;

Fig. 5 here

The system of separate collection and the collection of MSW and MMW is based on several levels in the SMR. The foundation of the system is to capture the containers. As follows are collected: paper, plastics (in some municipalities introduced sack collection), glass and MMW. In recent years there has been an expansion and container collection of biowaste from MSW, which will continue in the coming years. Second stage of collection and collection are *collection yards* (see Fig. 5), where, moreover, are collecting primarily bulky and hazardous waste. Many of them were built in the last period (2010-2015) with the use of public resources under operational programme environment. In municipalities where is not build collecting yard they are collecting hazardous waste mobile (following periodicity according to the Waste act). Many

municipalities provide mobile collection of bulky waste. Some municipalities have a contract with the adjacent municipality, which has a collection yard, and citizens are allowed to postpone the collection of waste in this village. From the perspective of network collection yard equipment is needed to continue the thickening and the optimization of the network of these yards and lend support.

- b) by 2020, increased to at least 50% by weight of the total level of preparation for reuse and recycling at least for waste materials such as paper, plastic, metal, glass, originating from households, and possibly a waste of different origin, if these waste streams are similar to waste from households.

The target part of WMP formulates strategy the PA of SMR for implementing WMP using national and EU subsidies:

- a) to keep, to promote and develop a separate commodity collection (paper, plastic, glass, metals, beverage cartons) with regard to the objectives set out for each materials and with regard to the higher quality the following collected waste;
- b) to maintain and develop the availability of separate collection of waste recoverable in the municipalities;
- c) to ensure (to implement) in the municipalities of compulsory sorted collection of recyclable components of MSW, at least the paper, plastics, glass and metals.
- d) to ensure that municipal MSW collection system provides the municipality availability of MSW technological processing;
- e) range and method of separate collection of MSW components in the municipality provides the municipality with regard to technical, environmental, economic, and regional opportunities and conditions for the further processing of the MSW, while separate collection must be sufficient to ensure that the objectives of the WMP for MSW.

Results

There are presented chosen information for the analytical part of the WMP of SMR (Hřebíček et al. 2015). The generation of MSW at the SMR fell from 656 809 tonnes in 2009, up to 624 668 tonnes in 2013, i.e. from 562 kg per capita in 2009 to 535 kg per capita in the year 2013. The largest generation MSW per capita in 2013 was in the PA district Pohorelice (866 kg) and the smallest one was in the PA district Moravský Krumlov (354 kg). The share of recovered (material and energy used and composted) MSW in the period 2009-2011 grew from 38.8% to 80.7%, but in 2012 it dropped to 79.4%, and decreased to 74.3% in 2013.

The amount of landfilling MSW during the years 2009-2013 gradually decreased every year from 52.3% (relative to the generation of MSW) in 2009, up to 31% in 2013. In 2013 the quantity of landfilling MSW over 2009 by 150 tonnes to 274 193 361 tonnes. Most of landfilling MSW consists of mixed municipal waste (MMW) and bulky waste. In 2013 it was landfilling about 129 000 tons of MMW and 67 thousand tons of bulky waste. We can see (Fig. 2) in 2013, the share utilized MSW was 78% of total MSW, of which 35% amounted to a material recovery and 37.3% to an energy recovery, 31% landfilled and 2% composting.

In the current generation of MSW about 624 thousand tons a year is still a large room for increase in capacity equipment for material and energy use of MSW.

Dealing with MSW in that period 2009-2013 was defined mainly and successfully completed a reconstruction in progress equipment for energy recovery of waste plant in the city Brno, which since 2009 has been gradually put into operation. This, together with the increasing share of MSW material recycling led in the years 2009-2011 to the radical increase in the share of recovered MSW and depression at the same time tipping of such waste. While the trend to reduce the landfill associated with declining generation MSW managed to keep even in the period 2011-2013, energy use remained at the same level, the corresponding capacity in the SMR and the proportion of material recycling and energy recovery

MSW even slightly decreased (also in the context of declining production MSW). A large proportion of landfilled MSW (31% in 2013) is undesirable and, therefore, its departure from the landfill toward its utilization (material and energy) is very important, because of the forecast of MSW generation shows only a slight MSW drop about 9 thousand tonnes to 2025.

Conclusions

We can follow the mandatory and target parts of the WMP of the SMR and forecast the generation of MSW is based on the forecast of development of WM contained in the WMP of the Czech Republic for the period 2015-2024. It can be assumed that the WMP of the SMR will be fulfilled, than the trend of WMS generation will slight decline in similar way as WMS ran in the Czech Republic in the years 2009-2013 corresponds to the developments in SMR, where there it was virtually the same. Therefore, we assume that future developments in generation MSW will be similar as in the Fig. 2. The following Fig. 6 and (actual production and forecast production) and Tab.1 is to see that this is more or less on the extrapolation of the existing trend, with a slight slow down the decline in MSW generation in the next 10 years.

Fig. 6 here

Tab. 1 here

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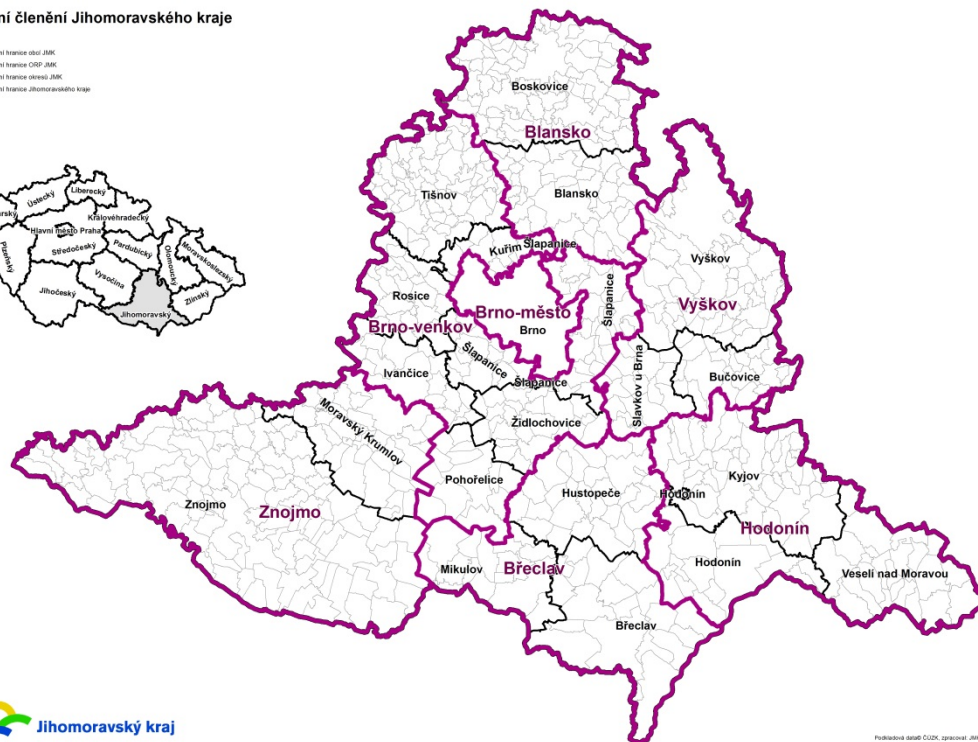
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Správní členění Jihomoravského kraje

- správní hranice obcí JMK
- správní hranice ORP JMK
- správní hranice okresů JMK
- správní hranice Jihomoravského kraje



Podkladová data: ČÚZK, zpracoval: JMK 2012

Figure 1: Public administration districts of the South Moravia region.

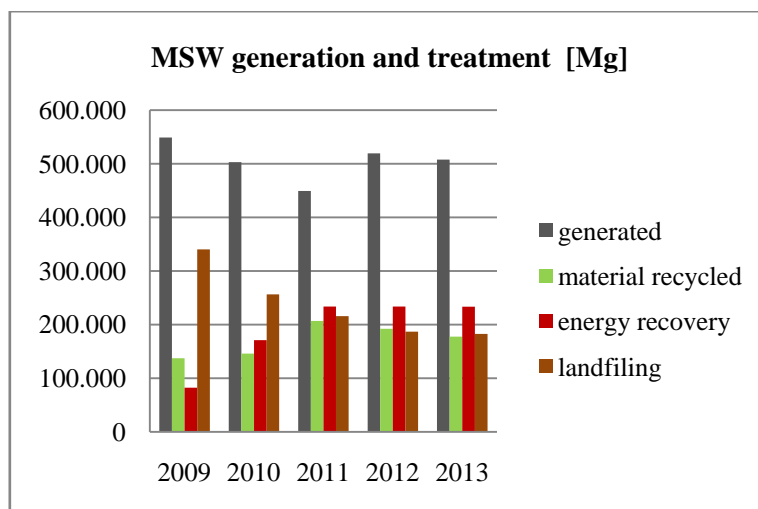


Figure 2: MSW generation and treatment in the SMR during 2009 -2013



Figure 3: Map of energy recovery facilities in the territory of the SMR



Figure 4: Map of landfills in the territory of the SMR

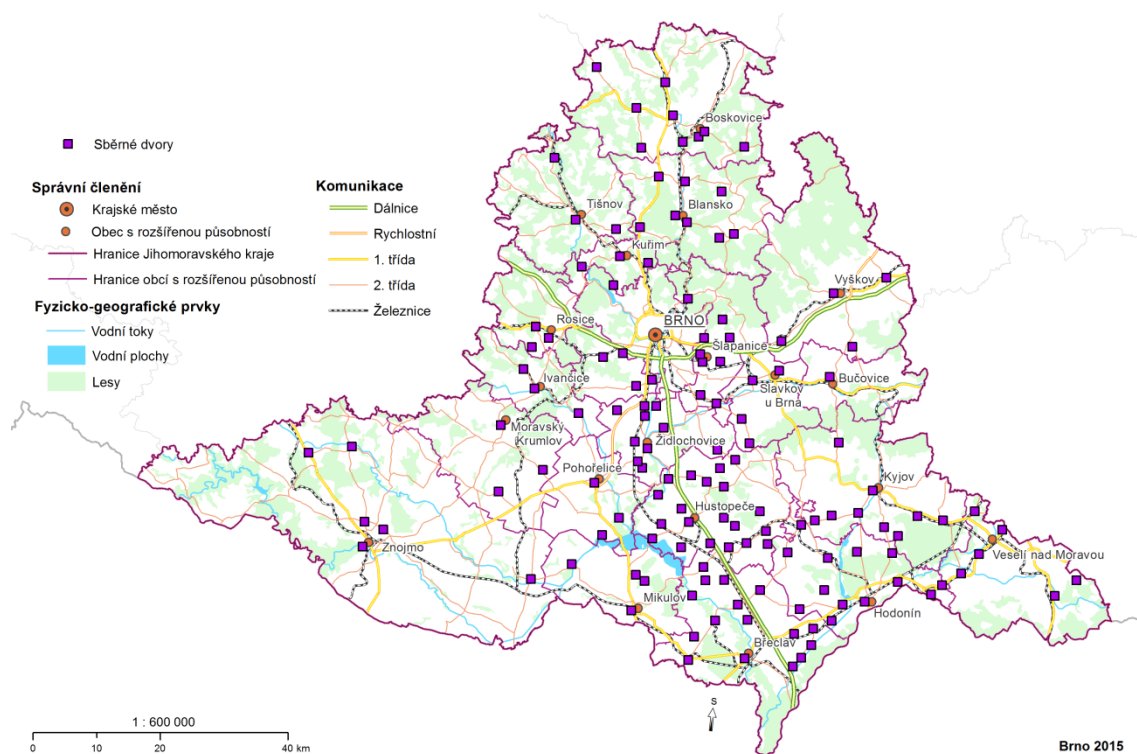


Figure 5. The map of collection yards in the territory of SMR except the city Brno

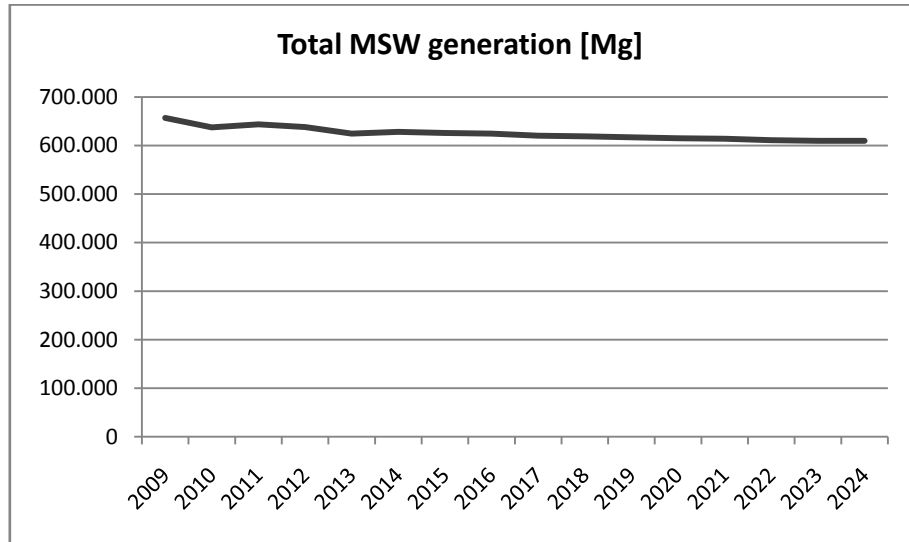


Figure 6: Forecast of total MSW generation in 2009-2024

Table 1: Forecast of MSW generation 2016-2024

Year	2016	2017	2018	2019	2020
Generation [Mg]	624 627	620 284	618 824	617 025	614 868
Year	2021	2022	2023	2024	2025
Generation [Mg]	614 044	611 193	609 756	609 885	609 856