



Charging systems for municipal solid waste: Experience from the Czech Republic

Petr Šauer*, Libuše Pařízková, Alena Hadrabová

Department of Environmental Economics, University of Economics, W. Churchilla 4, 130 67 Prague 3, Czech Republic

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ABSTRACT

The paper presents results of research into municipal waste treatment in the Czech Republic. Its special focus is on the impacts of various municipal solid waste charging systems on separating and recycling efforts of municipalities and households. The municipal solid waste charging systems are shortly described first, including the principles of the relevant Czech legislation. It shows that the Czech waste legislation provides space for implementing Pay-as-You-Throw (PAYT) models in the Czech Republic. The main results of representative surveys conducted by the authors within the EU PAYT project in 2003 in selected Czech municipalities and Prague households are shown. The survey confirmed that in municipalities that apply the PAYT charging system, citizens separate more waste and produce less residual waste. The survey data analysis has also shown which factors contributing to satisfactory waste separation are relevant and should be taken into the account when providing policy recommendations for introducing PAYT charging systems in other cities.

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1. Introduction

Household waste management seems to be one of the key topics of environmental protection at present and also in the future. The existence of a political consensus formulated as the effort both to minimize the total amount of household waste and to maximize recycling and recovery of household waste seems to be a common basis for formulating the goals of municipal solid waste management policies. Various tools and institutional settings are then introduced by central governments and municipalities to achieve this goal.

The experience from European and American cities (Bilitewski and Apitz, 1998; Canterbury, 1994) shows that this goal could be achieved if producers of municipal waste were charged according to the amount of mixed (residual) waste generated¹, i.e., if Pay-as-You-Throw (PAYT) models for waste charging were introduced. However, experience also shows that other factors, including public awareness, are also very important (see for instance Dijkema et al.,

2000; Šauer and Fiala, 2003; Bureš et al., 1998; Bilitewski et al., 2004).

PAYT systems also stimulate households to generate less waste in total. For instance Skumatz and Freeman (2006) bring in the US experience "... the systems have a huge impact on diversion – reducing residential disposal by about 17% ...". A study conducted in Sachsen in Germany showed that introducing PAYT reduced the total waste production by approximately 20% (SLUG, 1999). Also, the Czech experience has shown that introducing PAYT could reduce the total waste production in cities by up to 22% (Šauer et al., 2003).

In the Czech Republic, it is the municipality that is responsible for the treatment of waste generated by households and small businesses and for the waste that results from the activities of the town's operations. According to the law, municipalities are the originators of waste. The municipality is considered to be the originator of the waste from the moment that the waste producer (natural person) leaves the waste in a place designated for the purpose. This concept creates problems with introducing economic stimulation. Despite this legislative barrier, there is rich experience with various approaches to how Czech households pay for waste treatment.

The Czech Republic and its municipalities have substantial experience both with the PAYT systems and with flat fees for waste treatment. There is space for various combinations of both approaches. Moreover, the recent Czech history of waste fee models is very interesting for research purposes. Before 2002, Czech municipalities had quite good opportunities to choose the fee model. However, the legal regulation coming into effect January 2002 (Act No. 185/2001 Coll.) introduced the duty for municipalities to charge a flat per capita fee for waste treatment. Due to political

* Corresponding author. Tel.: +420 224 095 509; fax: +420 224 095 547.

E-mail address: sauer@vse.cz (P. Šauer).

¹ It seems useful to make a short note regarding how the terminology is used in the Czech Republic: *Municipal waste* – is the entire waste produced within the territory of a municipality by activities of natural persons. It consists of waste originating from households, small businesses, offices and schools, hospitals, from maintained open spaces, waste bins in public spaces and municipal market places. *Household waste* is one part of municipal waste originating from individual households (houses and apartments) of citizens. *Separated waste* is waste deposited by citizens and companies (natural persons) into containers for separated waste. *Mixed waste* (residual, unsorted, non-separated) waste is the part of waste that remains after waste separation and is deposited by citizens and companies into appropriate bins and containers (Environmental 1993–2005).

pressure, the law was amended in 2003 in a way that returned to the municipalities the possibility to choose a fee model depending on local conditions.

The key attention in the paper is paid to examining the behaviour of municipalities and households under alternative waste treatment payment schemes. The main results of a 2003 survey conducted among Czech municipalities and Prague citizens as part of the EU PAYT project² are shown. The survey attempted to confirm or reject the hypothesis that in municipalities which apply the PAYT charging system, citizens separate more waste and produce less residual waste. The survey data analyses have also shown which of all the possible factors potentially contributing to the satisfactory waste separation are statistically relevant.

2. Options for municipal waste fees in the Czech Republic

The options which could be used by municipalities for collecting payments for municipal waste are stipulated by the *Waste Act, No. 185/2001 Coll.* The options are as follows:

(a) *Fee for the accumulation, collection, transport, separation, recovery and disposal of municipal waste from natural persons on the basis of an agreement (Section 17, subsection 5 of the Waste Act)*: The agreement must be executed in writing and must specify the amount of the fee. If a municipality collects such a fee, it cannot stipulate a fee for municipal waste (as described in b) or a local fee (described in c).

This fee is not regulated, since the Act does not provide any details or restrictions. The amount of the fee is fully negotiable and depends on the agreement of the parties. The prices are usually derived from the waste bin volume and the frequency of collection. Everyone can choose a suitable variant from the offer. However, in this case, the Act does not establish any duty for the natural persons producing the waste to conclude such an agreement. In this case, the payment does not have the form of a charge. It is an agreed payment for a provided service.

In case that the municipality chooses this payment option, the Waste Act provides the following option: waste generators who generate waste classified according to the Waste Catalogue as waste similar to municipal waste generated in activities of legal persons and natural persons authorized to operate a business may, on the basis of an agreement with the municipality, utilize the system established by the municipality for the management of municipal waste. This option is frequently used by small craft businesses, restaurants, accommodation facilities, etc.

(b) *Fee for municipal waste (Section 17a)*: Within its autonomous competence, a municipality may stipulate, in a generally binding municipal regulation, the system of accumulation, collection, shipment, separation, and recovery and disposal of municipality waste generated within its cadastral territory.

The fee cannot be stipulated alongside a local fee for the operation of a system of accumulation, collection, shipment, separation, recovery and disposal of municipal waste pursuant to the special law.

The owner of the real estate where municipal waste is generated is liable for the fees. With respect to buildings where an association of owners of flat units has been established, the payer of the fee shall be this association pursuant to the special law. The payer of the fee shall charge the fee pro rata to the individual contributors.

The maximum amount of the fee shall be set according to the expected justified costs of the municipality following the municipal waste management regime, allocated to the individual contributors according to the number and volume of containers designed

for discarding waste per individual piece of real estate or according to the number of persons using an apartment and in relation to the degree of separation of this waste. The fee may also reflect the costs related to the lease of containers intended for discarding the waste.

(c) *Local fee for operation of a system of accumulation, collection, shipment, separation, recovery and disposal of municipal waste (Section 84)*: This fee cannot be applied simultaneously with the fees described in (a) or (b). This local fee is paid by every local permanent resident. The fee can be turned over by a common representative of the household or by the owner or administrator of the house for all households or for all permanent residents in the house. Owners pay a municipal waste fee for a recreational building in the amount equivalent to 1 permanent resident in the event that there is no permanent resident living in it. The total annual rate of this fee may amount to a maximum of 250 CZK (about 10 Euros) per person or per recreational building, which amount is calculated on the basis of the actual costs of waste management in the municipality in the previous year – for a maximum of 250 CZK (about 10 Euros) per person.

3. Objectives and methods of the surveys

We conducted two statistical surveys on waste management with a special focus on functioning PAYT systems in the Czech Republic. The first one dealt with the behaviour of the Czech municipalities (November–December 2002). The second one concerned the behaviour of Prague households (January–February 2003).

The starting point for the analysis was the formulation of hypotheses. The main objective for the waste management was the idea of minimizing the total amount of household waste produced and simultaneously maximizing separation.

The main tasks of the survey among municipalities were formulated as follows:

- To confirm or reject the hypothesis that in municipalities which apply PAYT citizens separate more and produce less residual waste.
- From the group of all possible factors, choose those that influence the amount of production of individual components of municipal/household waste, or those that influence the percentage of municipal/household waste separation.

The main tasks of the survey in Prague households were as follows:

- To confirm or reject the hypothesis that households that separate waste generate statistically relevant lower volumes of residual waste.
- To test which factors of those discussed in the PAYT project are statistically relevant for the behaviour of Prague households, i.e., which stimulate them to separate their waste.

Formally, it is possible to write the key statements as follows:

$$H_0 : \mu_1 = \mu_2$$

$$H_1 : \mu_1 > \mu_2, \text{ respectively } H_1 : \mu_1 < \mu_2$$

where H_0 is the tested hypothesis and H_1 is the alternate hypothesis. In our case μ_1 was the mean value of the amount of household waste produced by one citizen in the set of municipalities not implementing a PAYT system, respectively the mean value in the household sample of the amount of mixed waste produced by a household that separates its waste. The value μ_2 was the mean va-

² Fifth EU framework project "Variable Rate Pricing based on Pay-As-You-Throw as a tool of Urban Waste Management (PAYT)". The methodology applied was discussed within project GACR No. 402/06/0806.

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