

IMPACT OF WASTE DEPOSITION FEES ON ENTERPRISES IN THE CZECH REPUBLIC

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1. Economic Tools for Environmental Protection

During the transformation of the Czech Republic after 1989 aims of environmental improvement were highly prioritized among other important political, social and economic goals. In order to improve the environmental situation the specific environmental legislation was developed and/or updated. These steps had a significant impact both at macroeconomic, as well as at enterprise level [1].

One can state that initial tools of environmental policy in almost all European countries were primarily of normative instruments. The Czech Republic was not an exception. However, the experience shows that in comparison to them the economic tools have greater capabilities of changing the decision making patterns of economic agents and, what is also important, with relatively lower costs connected with state administration and control. That is why in addition to traditional *administrative* the set of *economic* tools is step by step introduced in the Czech Republic.

Economic tools in the field of environmental protection are represented by those measures that actively influence behavior of economic agents that are either using, damaging or polluting environment or its particular components. The basis for practical use of economic tools is a so-called Polluter Pays Principle (PPP). This principle was formulated within OECD framework back in 1972 [5]; two decades later, in 1992, it was integrated within EU Maastricht agreements.

Economic tools *contribute to internalization of externalities*. The term “contribute” is critical, since these tools aren’t and probably can not be the only form of the internalization in practice. The reason for using the economic tools is that they provide additional necessary market signals in those particular areas (e.g. environmental issues)

where market fails to do so. Economic nature of these tools enables polluters to choose which form of behavior is more financially sensible for them [2]: whether to continue depleting natural resources or polluting the environment (and therefore e.g. pay respective fees) or to decrease environmental burden of their business by investing into environmental friendly technologies and equipment. One should also mention the role of some of these tools connected with fiscal redistribution of financial resources.

At present one can classify the range of existing economic tools in the Czech environmental policy as follows:

- environmental pollution fees;
- natural resource use fees;
- user charges;
- administrative charges;
- tax differentiation;
- financial aid;
- deposit-refund systems;
- trade able permit systems.

One of the important economic tools is the category of *environmental pollution fees* (or charges). Experts regard the application of environmental fees to be the most appropriate in those areas where a) environmental pressure is caused by multiple and heterogeneous agents making command and control measures or negotiations impossible, b) each party proportionally contributes to overall impact, c) pollution abatement costs differ significantly from agent to agent, and d) each party can be monitored at reasonable cost among others (see [6] for details). This is the case of waste deposition charges analyzed in this paper.

Environmental pollution fees represent a significant but, however, at the same time a relatively problematic tool. The main issue connected with application of fees is defining their level. Would

the chosen fee rates effectively motivate polluters to reduce production of waste and emissions? Wouldn't the established charges be too high therefore negatively affecting the level of national business competitiveness, pushing up unemployment, and increasing the price level? Furthermore, wouldn't the newly set up fees intensify free-riding practices when polluters would rather reduce environmental costs by evading the law? Experts and other stakeholders should admit that answering these questions is no simple task. Evidently the first step to finding the answer is to quantify the fee impacts in a methodologically sound and statistically representative manner.

2. Waste Deposition Fees in the Czech Republic: Past and Present

Since the beginning of the 90's the Ministry of the Environment of the Czech Republic has carried out several projects aimed at quantifying the impacts of environmental pollution fees. The known issue of such experiments is the lack of available data, since companies tend to regard the cost structure to be a matter of business secret and do not specify fees within the bulk figures of their yearly reports. One of the initial attempts of environmental pollution fees' analysis is described in [3] consequently followed up by [4] which together cover the period of 1990-1994. These questionnaire-based projects, however, were primarily focused at air pollution charges. Another analysis of 1993 was focused among others at waste deposition fees; its results are described in [8]. One common shortcoming of all

above mentioned attempts was a relatively limited sample of respondents (e.g. [3] was based on data from 54 companies, [4] covers 64 economic agents).

In 2008 the Ministry of the Environment started activities aimed at updating waste deposition fee rates in 2010. In order to support the respective decision-making processes it was decided to perform an extensive analysis involving data from several existing databases. The project was aimed at assessing contemporary impact of environmental charges on the economic indicators of companies (namely on revenues, consumption from operation and value added) as well as modeling the possible consequences of the assumed update scenario. The following text presents a short description of the Czech Republic's waste deposition fee system development consequently introducing results of the above mentioned original experiment.

2.1 History of Waste Deposition Fees in the Czech Republic

Waste deposition fees are used in number of countries. For instance Netherlands introduced such type of fee back in 1981. The fee's fiscal function was the main reason for its introduction. Belgium has also introduced this fee also in 1981, but the main stress was placed on the stimulating function of this economic instrument. In general the fee rates depend on type of waste under consideration and method of its processing before the deposition. The main principle is as follows: composted or combusted waste

Tab. 1: Waste deposition fee rates according to law no. 62/1992 Coll., on waste deposition fees (CZK/t)

Waste type	Rate I	Rate II					
		1992	1993	1994	1995	1996	1997
Earth and mining waste	0	1	3	6	6	6	6
Other waste except earth and mining waste	10	25	70	140	140	140	140
Solid municipal waste	20	20	70	210	210	210	210
Special waste except hazardous and Solid municipal waste	40	110	320	640	640	640	640
Hazardous waste	250	3 000	4 000	5 000	5 000	5 000	5 000

Source: [11].

deposition fees are lower in comparison with waste directly deposited to landfills. According to international experience agents by whom the fee is borne and paid may differ. For instance, in Germany the fee was initially paid directly either by waste producers or by agents responsible for waste disposal. However, consequently this duty has been transferred to landfill site operators.

However the time had come when the stimulating effect of these fee rates decreased and the update became necessary. The 1997 version of law on waste [9], has introduced several changes concerning the waste deposition fees. The law has declined the *special waste* category of waste. Furthermore for the aims of fee collection simplification all the waste was divided into two

Tab. 2: Waste deposition fee rates according to law no. 125/1997 Coll., on waste (CZK/t)

Waste type	1998	from 1999 to 2000	from 2001 to 2002	from 2003
Hazardous waste (basic components)	200	250	350	450
Hazardous waste (risk components)	300	500	850	1000
Municipal waste and other waste	20	30	50	80

Source: [9].

The acquired financial resources are consequently used for old landfill sites' sanitation and recultivation.

The waste deposition fee in the Czech Republic was initially introduced in 1992 by the law on waste deposition fees [11] that was later amended in 1995. The fee was paid by landfill operators. The fee rates depended on the amount and type of deposited waste. The fee rate I was supposed to stimulate the minimization of waste and its possible recycling. If the landfill site didn't fulfill the specific requirements to landfill site operation, the rate II was used instead of rate I. The rates have been consequently increasing until 1994 (see Tab. 1).

categories: *hazardous* and *other waste*. On the one hand conditions of hazardous waste operation were restricted. On the other hand they were simplified in case of other waste types. The progressive dynamics of both types of fees had been sustained (see Tab. 2).

At present the waste operation is regulated by the law on waste of 2001 [10] (see Tab. 3). The fee is composed of two components – the basic and the risk one. The rate of the fee basic component applies to all categories of waste (it is differentiated into two levels, one for municipal and other waste, and the other for hazardous waste). The risk component of the fee only applies to hazardous waste. The landfill operator transfers

Tab. 3: Waste deposition fee rates according to law no. 185/2001 Coll., on waste and on amendments to other laws (CZK/t)

Waste type	from 2002 to 2004	from 2005 to 2006	from 2007 to 2008	from 2009
Hazardous waste (basic components)	1100	1200	1400	1700
Hazardous waste (risk components)	2000	2500	3300	4500
Municipal waste and other waste	200	300	400	500

Source: [10].

fees to their recipient, i.e. a municipality within the cadastre where the landfill is situated (basic component), and to the State Environmental Fund (risk component).

As it has been mentioned, at present the new amendment of law on waste is being discussed. The amendment contains several changes concerning the waste deposition fees among others. Until present the fees had covered only those activities that were connected with waste deposition on landfill sites. The amendment stipulates the new types of fees covering the waste disposing types that are regarded to be environmentally unfriendly. The aim is to economically disadvantage waste dumping and to stimulate recycling. The fee should be paid by disposal operators that in their turn would include them into the price they demand from waste producers for waste disposal services. The special fee would be introduced for disposal of technological materials for technical maintenance of landfills. This step is motivated by the practical experience, when landfill operators tried to avoid paying fee by "reclassifying" waste into technological material.

2.2 Waste Deposition Fees and Their Impact on Enterprises

Based on the order of Ministry of the Environment in 2008 Jan Evangelista Purkyně University in Usti nad Labem in cooperation with the Czech Statistical Office prepared a pilot analytical study [7] with the following aims:

- quantifying the share of fees in selected economic indicators of enterprises in the year 2006;
- formulating a methodology of possible identification of the impact of fees updating on the enterprises; and
- quantifying the potential impact of the newly proposed fee rates on economic agents in 2010.

The waste deposition fee impact analysis consisted of the following several steps. First, the sample was defined based on the data of 2006 available in the Czech Statistical Office (the year 2006 was chosen because not all necessary information for 2007 was available at the time the study was prepared). One should mention that CZ-NACE 90 (Sewage and refusal disposal, sanitation and similar activities) enterprises were omitted. The total of 8665 enterprises was finally included into the analyzed sample. This presents the results of the most extensive analysis ever made in the Czech Republic focusing at the impact of both current and newly proposed environmental fee rates on companies.

In the second phase the relative share of respective fees in selected economic indicators of enterprises in the year 2006 was calculated. The three types of indicators were chosen for this purpose: a) share of waste deposition fee in total revenues of an enterprise; b) share of waste deposition fee in consumption from operation; c) share of waste deposition fee in value added.

Finally, the potential impact of the updated fee rates from possible scenario (see Tab.4) on economic agents in 2010 was quantified. The set of analyzed indicators remained the same. The reported amount of individual fees in the year 2006 was recalculated according to the amount corresponding with newly suggested rates for 2010. This quantification was based on the conservative assumption that the volume of production, consumption standards and price relations remain at the level of the year 2006.

One should highlight the following results of the performed analysis. In 2006 totally 328 enterprises (i.e. approx. 4 % of the entire set of enterprises) together paid 80 % of the whole amount of the collected fees. If proposed scenario of fee update was applied, the number would increase to 337 enterprises. These enterprises represent particularly such industries as a) NACE 45 Construction, b) NACE 40 Electricity, gas, steam and

Tab. 4: Scenario of fee rates updating till the year 2010

Waste production fees (CZK/t)	scenario 2010
Hazardous waste	7000
Municipal waste and other waste	700

Source: Ministry of the Environment of the Czech Republic.

Tab. 5: The largest deposition fee payers grouped according to branches (%)

CZ – NACE	Name	2006	2010
45	Construction	32.96	30.53
40	Electricity, gas, steam and hot water supply	10.04	9.40
27	Manufacture of basic metals	9.59	11.21
37	Recycling	4.29	4.10

Source: Czech Statistical Office, own calculations.

hot water supply, c) NACE 27 Manufacture of basic metals and metallurgical products, and d) NACE 37 Recycling among others (see Tab. 5). One should also mention that in these industries the share of waste deposition fees does not dramatically differ from the average indicator.

however, the distribution of positions in the chart would remain the same.

The following Tab. 7 presents the variability of the analyzed indicators in the analyzed sample. As one can see the average share of waste deposition fees in company revenues was equal to

Tab. 6: The largest deposition fee payers grouped according to size (%)

No of employees	2006	2010
250 - 499	16,08	15,62
500 - 999	9,64	10,32
50 - 99	7,73	7,45
100 - 199	7,56	7,09
1500 - 1999	7,03	6,99

Source: Czech Statistical Office, own calculations.

Considering the size of the largest deposition fee payers it is possible to state that the most significant share of waste deposition fees is being paid by large companies with 250 to 499 and 500 to 999 employees (see Tab. 6). Keeping in mind the assumptions, one can see that the 2010 update would introduce some minor changes in the structure of the largest payers;

0.04 percent in 2006. The higher average ratio of the considered fee to consumption from operation (equal to 0.06) could have been expected, since the firms are generally motivated to generate revenues in excess of the respective costs.

The closer analysis of the sample has brought the following results (see Tab. 8). In general one can state that in 2006 share of fees in revenues

Tab. 7: Indicators of variability (%)

	(Fee) / (Revenues)		(Fee) / (Consumption from operation)		(Fee) / (Value added)	
	2006	2010	2006	2010	2006	2010
Min	0.00	0.00	0.00	0.00	(-122.23)	(-343.11)
Max	23.69	66.54	15.32	43.02	125.29	351.69
Mean	0.04	0.12	0.06	0.19	0.19	0.56

Source: Czech Statistical Office, own calculations.

Tab. 8: Distribution of the frequency of individual indicators (%)

Share indicator range (%)	(Fee) / (Revenues)		(Fee) / (Consumption from operation)		(Fee) / (Value added)	
	2006	2010	2006	2010	2006	2010
≤0.5	98.67	95.90	97.78	93.54	94.03	86.22
0.5-1	0.89	2.00	1.29	3.14	2.70	5.62
1-5	0.39	1.88	0.80	2.92	2.70	6.21
5-10	0.03	0.14	0.09	0.21	0.30	1.15
10-50	0.01	0.07	0.03	0.20	0.22	0.66
>50	0,00	0.01	0.00	0.00	0.05	0.14

Source: Czech Statistical Office, own calculations.

amounted up to 0.5 percent in 98.7 percent of cases. In 2010 a slight increase in payers would be observed in the categories with max. 5 percent share. This enables one to conclude that the share of waste deposition fees in revenues is quite insignificant in general case.

The distribution of share of waste deposition fees in consumption from operation somehow repeats the previous situation. In general case this share oscillates at 0.5 percent level in case of 97.8 percent of respondents. Again, in 2010 a moderate increase would be observed in categories amounting to 5 percent. One should stress that the above provided results were achieved given an assumption that neither productivity nor economic results of the companies in the sample would change in 2010. This enables to assume that analyzed economic indicators would remain at the level of 2006. Assuming that businesses in general are focused at growing and improving their economic results over time, it is possible to conclude that the real impacts of the proposed scenario would be even lower.

Additional attention should be paid to marginal companies representing economic agents mostly affected by waste deposition fee rates. As one can see the share of fees in revenues exceeds the 10 percent limit in exceptional cases (0.01 percent of sample companies). In case of 2006 this is in fact only one medium-large company with limited liability with the 23.7 percent ratio of waste deposition fee to revenue. Furthermore this company reported the negative value added in the analyzed year when its consumption from

operation exceeded its revenues. Assuming that the economic data acquired from the Czech Statistical Office is correct, it is quite obvious that this company is far from being competitive and probably is in the state of crisis.

The group of companies whose ratio of waste deposition fee to revenue in 2006 was between 5 to 10 percent limits represented only 3 of 8665 firms in the analyzed sample with one recycling company (NACE 37) and the two others coming from the construction industry (NACE 45). In contrast to the first mentioned firm, revenues of these 3 companies exceeded the consumption from operation. However, the waste deposition fee was unusually high making around 12 percent of consumption from operation and from 10 up to 40 percent of value added. These 3 firms in fact are identical with the 0.03 percent of respondents, whose share of fees in consumption from operation was between 5 to 10 percent in 2006.

Consequently, 0.39 percent of the sample (i.e. 34 companies) formed the group with share of fees to revenue between 1 to 5 percent in 2009. Those were prevalingly medium-large businesses (20 to 99 employees – 79 percent of respondents) with limited liability (58 percent of cases) and the main reported economic activity in construction (64 percent of companies). Furthermore, 6 percent of them reported revenues under the level of consumption from operation. One should also mention that the vast majority of companies with ratio of fees to consumption from operation between 1 to 5 percent (0.08 of sample in 2006) are actually coming from the above mentioned category.

Finally, 74 percent of firms with 1 to 5 percent share of fees in consumption from operation (0.80 percent of the analyzed sample) had this ratio under the 2 percent level. More than a half (54 percent) of them was represented by companies from construction industry (NACE 45).

Conclusions

Though the transformation processes in the Czech economy created the necessary space for more effective action of economic tools, the waste deposition fees seem to be too low to achieve the environmental goals by motivating polluters to change their behaviour. In this respect, the waste deposition fees are only supplementary to normative tools of environmental policy. The following indicators confirm this conclusion:

- In 98.7 percent of cases the share of waste deposition fees in revenues amounted under the 0.5 percent level in 2006. Assuming that analyzed economic indicators would remain at the level of 2006 one would observe the 2.71 percentage points' increase of number of economic agents in the categories with 0.5 to 10 percent share of fees in revenues in 2010. As it was already mentioned, estimations of 2010 were based on assumptions that economic performance would remain at 2006 level with only fee rates changing. However, in this respect one can say that the share indicators calculated for 2010 represent the pessimist scenario of development. Furthermore it was assumed that the companies would generate as much waste in 2010 as they did in 2006.
- The average ratio of waste deposition fee to consumption from operation was fluctuating around 0.06 percent level and almost 98 percent of companies in the sample had this indicator under the 0.5 percent level.
- Among the biggest waste deposition fee payers in 2006 one could observe companies representing construction, electricity, gas, steam and hot water supply, manufacturing of basic metals and recycling industries.

The waste deposition fees' analysis showed that in the vast majority of cases the considered fees have very low shares in the main economic performance indicators. Only in marginal cases the respective ratios exceed the 0.5 percent level. Assuming that the Czech Statistical Offi-

ce provided accurate data, in number of these cases one can speak about firms in the state of crisis generating the negative value added. The rest of marginal firms show unusually high ratios of waste deposition fees to indicators of economic performance. This however can not be adequately explained with a view to methodology applied in our research. Because individual data was actually concealed from the analysts it is impossible to make other than formal conclusions; this is the sphere where the questionnaire approach could be of greater use.

Speaking about the assumed fee rates' update, the performed analysis has not demonstrated any dramatic impact of the planned reform on the company economic performance indicators in the vast majority of cases. Once again, one should rather speak about marginal examples when fee shares exceed the 1 percent level of the analyzed indicators. Under these circumstances it is unlikely that the updated fees would have a strong impact on the costs' structure of waste deposition fee payers.

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ABSTRACT**IMPACT OF WASTE DEPOSITION FEES ON ENTERPRISES IN THE CZECH REPUBLIC**

This article presents the partial results of the most extensive analysis focused at environmental fees ever made in the Czech Republic performed by Jan Evangelista Purkyně University in Usti nad Labem in collaboration with the Czech Statistical Office. The current paper is focused at describing the impact of both current and newly proposed waste deposition fee rates on the set of enterprise economic performance indicators. The first part of the paper provides a description of history as well as the current situation in the field of waste deposition fees in the country. The second part of the paper shortly describes the applied methodology of data collection and analysis. Such indicators as a) share of waste deposition fee in total revenues of an enterprise; b) share of waste deposition fee in consumption from operation; c) share of waste deposition fee in value added were calculated. The analysis consisted of the two consequent steps. The first was focused at quantifying the share of fees in selected economic indicators of enterprises in the year 2006. The second step consisted in quantification of the potential impact of the fee rates newly proposed by the Ministry of the Environment on economic agents in 2010 given an assumption that neither productivity nor economic performance of the companies would change. The final part of the paper presents the general conclusions about the stimulative potential of current and updated fees used as economic tools of environmental policy.

Key Words: waste deposition fees, environmental policy, enterprise, economic impact, Czech Republic.

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