EXTERNALITIES AND MARKET FAILURES IN THE WASTE MANAGEMENT – CONNECTION WITH THE DIFFERENT WASTE MANAGEMENT CHARGES

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ABSTRACT The EU's environmental program and system of funds have been drawn up according to different environmental/social needs, thus the economic evaluation of investment circumstances is not closely connected to the Hungarian requirements. In many cases it causes unjustified difficulties in economic development under colour of pollutant emission which potentially never appears but which should be avoided. As a negative sample, it often happens that regional landfills are established to place the potentially waste in the future, the waste that would not even be created due to conscious environment policy. So it is very important that the quality and quantity of the externalities related to waste management should be authentically explored in the fast-developing countries (East-EU-new members). These, mainly economic and social analyses, could be the basis of the cornerstones of fundamental regulation of waste management and environment application. In this case it is about a significant development stage, since this direction determines the future tendencies of both the environmental industry and the resource-application.

1. INTRODUCTION

Market failure is said to occur when some cost and or benefits are not fully reflected in market price. The market system fails to function property for many kinds of environmental goods because such resources, including the service they provide, are often not traded in markets. In general market prices don't fully reflect the value of environmental goods and services. We would like to demonstrate that the waste management market failure results in an inefficient allocation of resources and social economic situation. Market failure can occur due to of the following mainly:

- Externalities and
- Type of market structure.

An externality is said to exist when the utility of an economic agent is affected by an action of another. Generally fallowing factors give rise to externalities, interdependence between economic agents. The activity of one agent affects the utility or production function of another. However the market system fails to price this interdependence, as a result of which the affected party is uncompensated. Or we can speak very often about the externalities if the transaction cost is too high. The cost of negotiation, implementing and enforcing an agreement between the parties may be high (Asafu-Adjaye, 2000).

The high number of market failures and the related external effects have very negative effects on the optimalization of cost-structure of waste-management. The fundamental problem of cost/profit approach of

waste management is that there are not authentic data about the marginal costs of treated waste. The determination of exact external marginal costs depends on the economic environment and the level of its contamination. So we can state that even in the same economic area (i.e. the application of the same environmental norms) we cannot calculate with the same external marginal costs because the rate of return of the waste-management investments may be different based on the different levels of contamination. A good example for this may be that in the less-developed regions of the new EU member states (10 countries) the waste-management investments cannot be interpreted rationally, since the size of optimal regional landfills in accordance with the EU standards is too big for the capacity of the given economic and social community, i.e. they do not produce enough waste for the optimal utilization of the landfills.

Those EU environmental investments which are not based on economic, but rather on social utility generate quite unfavourable and market-deforming effects. A good example for this is if we put the system of waste-fees under a cost-structure examination. The waste-management investments carried out not by enterprises (e.g. in the case of Hungary) are funded by only the state or the EU. These investments can be differentiated by the features and types of available funds. So the structure of the tenders determines what kind of waste-management strategy should be carried out in one or another area, should we burn or deponate and whether waste-selection strategy should be applied.

The consequence of this development concept which is not quite thought over from economic point of view is that the environment quality differences due to different economic development levels are not taken into account in the investments, there are not authentic data on waste-management in existence. Thus the most important aim of the waste-management investments becomes to be not the meeting of environmental requirements, but the gaining and spending of EU funds. Due to the the lack of social and economic system of interest waste-management becomes one of the most popular fields of corruption processes.

The reason for the inequalities of the source-side of waste-management investments can be well demonstrated in Hungary, where there are different systems for the calculation of waste-fees. Different companies apply different fees and there could be 3-4 times higher fees in one case for the same type of waste than in another. The difference in the system of fees certainly does not depend on the weights of environmental externalities, but is based on the „support-content” of the realized management-system.

It is not surprising that the fee of the waste does not contain the external costs related to a given waste, but it deforms the market of waste-management and it makes impossible the structuring of the market, so the support-content of the investment costs is not presented in the determination of waste-fees. This situation results in the underestimation of the system of waste-fees, which generates further overuse of resources, and which shows a direction towards the ignoring of the waste-management based on market features.

2. TYPE OF EXTERNALITIES IN THE WASTE MANAGEMENT

Pecuniary externality is a form of externality that is transmitted through the price system. An externality is an unpriced effect. A pecuniary externality occurs when the externality is transmitted through a higher price or reduces costs (Kerekes, 1998). In the waste management we can count with this externality like this reduced waste-receiving cost, which cost not include the total cost of investment and external cost of environmental pollution.

Figure 1. presents well that the shortage of content of waste fee-system fundamentally modify the creation of market related to the treatment of waste and the direction of development processes. On the basis of the figure it can be easily understood that current costs, i.e. the cost-structure of (communal mixed) fees of waste is underestimated, since it does not calculate either with the external marginal costs, or the real costs of investments into the rate of return.

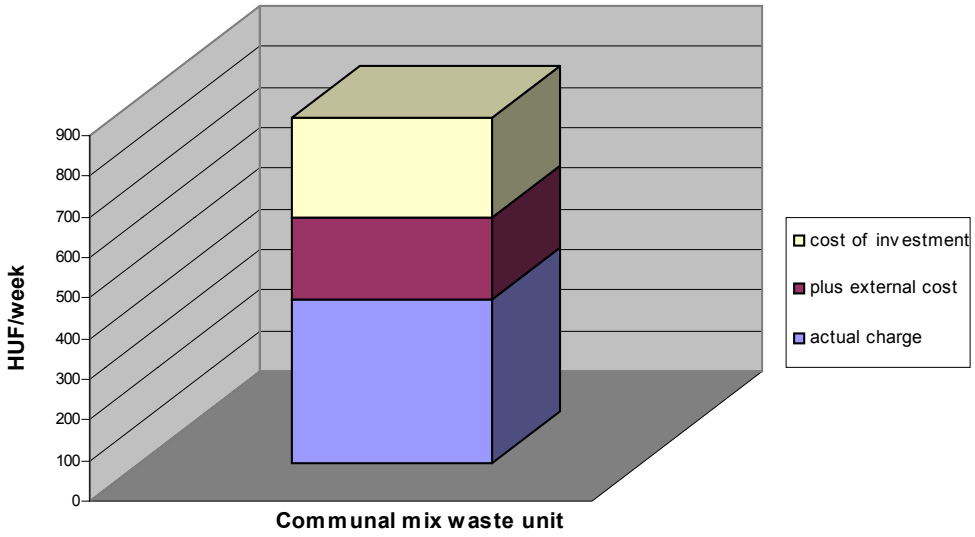

Figure 1. Structure of waste charge

The fundamental reason for appearance of the problem is that in practice waste-management investments are initiated not on the basis of appropriate cost/profit analyses. The most common calculation forms before decision-making are the simple return period, net present value and the internal rate of return, but these do not take e.g. the return of support-content into account. The application of investment-return indicators mentioned above mean increasing difficulties because of the long-term return of environmental investments.

The only one advantage of return-date is that it can be easily calculated. Since it weights equally the different inflows or outflows of money, it evaluates equally the present incomes and the incomes of three years from now. It does not take into consideration the money-flow after return-period at all. So the application of this indicator it is almost impossible to consider the environmental advantages. In the case of environmental and waste-management investments it cannot be used even for the first filtration of investment alternatives, since it does not form an appropriate basis for long terms.

The biggest defect in the simple return-period is that it does not take into account the money-flows after the date of return. Out of two different three-year-long projects one may produce profit for another 10 years but the other one must be replaced two years after the realization. Though their periods of return may be two years in both cases.

3. MATERIALS AND METHODS

For the calculations of the changing processes, like the operation of waste-management systems, we must choose such methods that can help us in determining the value of money and the investment at different dates of the projects. With the method of net present value (NPV) we can calculate how much the value of investment in money is in the different stages of the project. As calculating the net present value we need to use a discount factor which may basically influence the final value of NPV. The amount of the discount factor can be increased by some unfavourable factors like the inflationary rate, investment risk and the opportunity cost of the capital, thus they can reduce the positive feature of NPV.

The net present value of an investment consists of the cost of the initial investment and the present value of alll the money-flow expected in the future. The decision-situation and the rule of decision-making based on NPV is the following (Csutora, 2001):

- if the NPV is positive, the project must be supported
- if the NPV is negative, the project must be rejected
- if the NPV is zero, it does not matter if we realize the project or not, because we do not either gain or loose with it

If there are several projects with positive NPV, we need to choose the one with the highest NPV. The application of the indicator may be the basis for good decisions in theory, though some problematic issues may occur. Due to the application of discount rate, the opportunity cost of capital, e.g. the selection of the best alternative, mostly in such countries where there is high inflationary rate, it may move the calculated NPV to negative domain in the case of environmental and waste-management investments (Zimler, 2003).

It may often happen that in environmental investments the NPV is negative because of the long period of return and because other environmental profits are not taken into account either. This problem can be solved by involving EU-sources, thus NPV can become positive. Nevertheless, problems due to support-policy preferences may cause again difficult situation for decision. Its basis is the different support levels related to different strategies and their rational realization. The forced, centralized environmental strategies have damaging effects on the creation of waste-markets in most cases and concerning investments they do not move the system of waste-management towards optimal system applications either (Fogarassy et al. 2004).

Due to this there is a contradiction, presented on Figure 1, saying that the return requirements connected to central supports and the environment load related to waste cannot be enforced in the waste-fees. This may lead to the deformation, the overplanning and the undercalculation of the waste-management system, in which the market elements may become unviable.

The index of return of discounted money-flows may be better aspect to consider than calculating the simple return-date, but it hides shortages of methodology due to which waste-management investments cannot compete with other investments, though they represent higher values for the society/investor.

However, there are fields of environmental investments, where the calculation of NPV clearly shows us the enviromental usefulness of certain factors. The best sample of this may be the field of energy-saving, where the explanation for the positive interpretation is the relative high price-level of energy. With the next example we would like to show how the NPV calculation (with the application of discount rate) can positively influence the realization of such a project which is beneficial from environmental aspects opposite to the simple return-date.

The application of energy-saving bulbs is very favourable from environmental point of view. Compact bulbs are more long-lasting than the traditional ones and they consume much less energy. Unfortunately they cost much more (in this case 12 times more) than the traditional ones. On the basis of NPV is it worth to buy these bulbs? Can the cost- and life features form the basis of a cost-effective investment?

According to the given conditions the NPV of the compact bulb is 4410 HUF, i.e. the application of compact bulbs for 10 years may result in such a saving at present values. Economic factors and their changes may have significant effects on the return of environmental oriented projects (Table 1.).

The determination of discount-rates provides a certain level of subjectivity in the methodology of NPV calculation, so to avoid this, the internal rate of return (IRR) is commonly used in practice to calculate the return and whose calculation is very similar to the NPV but knowing the precise discount rate in advance is not necessary. As the result of the analysis we immediately get to the level of return of the project at present value. The internal rate of return is popular and it is commonly used. But unfortunately it has a serious defect: in the case of investment processes of several years - like the waste-management investments - the sign of yearly money-flows may change several times, so same values can be found for IRR in several cases, and we cannot choose the „real value”.

Table 1. NPV connection with the compact and traditional bulb

	Compact bulb	Traditional bulb	Additional cash-flow	Discount coefficient 1/(1+0,15)	Net Present Value
Starting cost HUF	-600	-50	-550	1	-550
1. year	-260	-1251	991	0,869	862
2. year	-260	-1251	991	0,756	749
3. year	-260	-1251	991	0,657	652
4. year	-260	-1251	991	0,571	567
5. year	-260	-1251	991	0,497	493
6. year	-260	-1251	991	0,432	428
7. year	-260	-1251	991	0,375	373
8. year	-260	-1251	991	0,326	324
9. year	-260	-1251	991	0,284	267
10. year	-260	-1251	991	0,247	245
NPV					**4410**

Concerning the return-indicators related to waste-management we can state that theoretically the best investment criterium is NPV, because it approaches investment-utility originated from waste-management characteristics the best way and in some cases, like in the energy-saving issues, environmental system of aspects with appropriate relevance may also be enforced.

4. CONCLUSIONS

On the basis of the researches carried out, several general consequences can be drawn. Their precise determination needs further specific investigations, but they can be considered authentic hypothesis. The major statements can be made connected to external marginal cost of waste. There are not exact data about the external marginal cost of treated waste, so the waste-management project cannot be assessed aothentically from cost-effectiveness point of view.

It can be also stated that price-sensitiveness examinations should be carried out on the cost-effectiveness investigations of environmental investments, since in the determination of NPV it can significantly modify the final rates of return. It may be especially significant in such case when the support-content of the investment may change (if the priorities of environment policy change or if the environment norms become more strict) or when the rise of the related external marginal cost curves change.

The practical application of return indicators proves us with no doubt that the usage of resources without external cost-content has bad effect on the return indicators and it damages the competitiveness of resource-saving investments. The application of high discount rates may also move the indicators of environmental investment towards unfavourable direction, so abreast of higher inflationary rates the NPV of environmental investments is also unfavourable. In spite of low return rates it can be stated that the sectoral application of loans with no interest may improve the real rates of return in the environmental investments much more efficiently than the non-refundable supports. The reason for this is that supports and the related environmental concepts deform the structure of waste-management. They usually over-evaluate or under-evaluate the available group of externalities, which paths the way for a bad, irreversible development way (mainly in the EU member states).

Abreast of fast economic development the risk level of environmental investments may be quite high, since the change of strictness of environmental regulations and of the amount of penalty fees and pollution fees may be quite powerful. In the case of investments with marginal returns this may be easily driven in both favourable and unfavourable directions, so in this context it is practical to carry out risk assessment too.

The EU's environmental program and system of funds have been drawn up according to different environmental/social needs, thus the economic evaluation of investment circumstances is not closely connected to the Hungarian requirements. In many cases it causes unjustified difficulties in economic development under colour of pollutant emission which potentially never appears but which should be avoided. As a negative sample, it often happens that regional landfills are established to place the potentially waste in the future, the waste that would not even be created due to conscious environment policy.

It can be clearly stated that because of the economic recession, due to the change of regime, the favourable economic status (indicators of soil-, water- and air pollution) of Eastern-European EU-members do not possess real economic values, so the listing up of the external effects of waste-management cannot either be convincing.

5. SUMMARY

In the welfare countries (EU 15) dealing with the waste-management fees is much more consistent, since the internalization of externalities caused by environmental effects like the cost-system of energy- and resource-application or the social/economic activities is carried out at an advanced level. Due to the high level of environmental demand of the society it is more or less natural, so it is useful to take the sytem for resource application in the most developed countries as a sample. It clearly shows that the usage of resources and energy is connected to high fees. The phenomena has strong effect on the differences between social groups, because keeping the fees of environmental load and waste low (long-lasting under-estimation) increases the social differences. The low fees facilitates only the welfare consumption of richer families.

So it is very important that the quality and quantity of the externalities related to waste management should be authentically explored in the fast-developing countries (East-EU-new members). These, mainly economic and social analyses, could be the basis of the cornerstones of fundamental regulation of waste management and environment application. In this case it is about a significant development stage, since this direction determines the future tendencies of both the environmental industry and the resource-application.

6. ACKNOWLEDGEMENT

The research was supported by the National Scientific Research Fund (OTKA F42611).

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