Towards a more sustainable waste management hierarchy for Poland[1]

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Introduction

Waste management policy in the European Union has developed to its present form with the aim to reach the maximum level of environmental protection and high recycling quotas. It is often criticised as not aiming at optimum recycling quotas and not supporting the most cost-efficient methods of waste management and therefore leading to welfare loss. EU enlargement extended this model to countries with a significantly lower level of economic development. Without any doubt EU accession does help these countries to establish environmentally sound form of waste management, especially considering the development of a more efficient system to cope with the environmental pressure of changing consumption patterns. On the other side, approximation to EU standards requires increased public and private household expenditure. In the first part of this paper, the present EU policy on municipal waste is outlined, followed by a critical assessment. In the third part the situation of waste management in Poland is present in the light of EU accession. In the following part a critical view is taken on the present developments in Poland. The paper concludes with policy recommendations which should help to formulate a waste management policy supporting sustainable development in the sense of taking environmental, economic and social aspects into account.

The European Union's policy on municipal waste management

Waste management is a key area of the Community's environmental policy since the early 1970's. The main principles of this policy were laid down in two horizontal directives: 'Framework Directive on Waste' (1975)

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and 'Directive on Toxic and Dangerous Waste' (1978). These directives define the principles and objectives of the subsequent legislation. The main principle is the waste hierarchy: prevention of waste generation is the primary goal, followed by the encouragement of reuse, the increase of material or energetic recovery as well as incineration of waste; save disposal in sanitary landfills is considered only as the last resort. The waste hierarchy reflects two main ideas of present waste management. Firstly, preventing the depletion of natural resources and secondly, the principle of precaution, meaning that the negative impact on the natural environment and human health has to be minimised [McCormick.2001.169f.]. Also the 'polluter-pays principle' is part of the waste regulations since the very beginning. The costs for treatment or disposal of waste have to be borne by the owner or generator of waste.

The remaining legislation on waste concerns either the treatment and shipment of waste or specific kinds of waste. The Common Market agenda brings in an additional principle of EU to the waste policy, the free trade principle: free movement of waste across national borders and the freedom to provide services like the processing and disposal of waste. Therefore, it was necessary to establish minimum standards for facilities treating waste to prevent environmental dumping. This led to the Directive on Municipal Waste incinerators (1989) and the Landfill Directive (1999) [Buclet.2002.28ff.]. Since the early 1990's life-cycle assessment became the major tool for the further development of waste policy. This method is not dealing with 'end-of pipe' solutions, but with the decrease of waste generated and disposed. The 'Packaging and Packaging Waste Directive' (1994) drew from experience of the German *DSD system* and the French *Eco-Embalages* system. The implementation of this directive led to a boost of European recycling industry and to a growth of the market of secondary resources[Fischer.2002.82].

Assessment of waste management in the EU

In 2003 577 kg/capita of municipal waste was collected in the EU, with Ireland (732 kg) and Greece (428 kg) being the most extreme cases. Both countries have also the highest growth rate of waste collected with an increase of ca. 40 % within 8 years (EU average 20 %). About 45 % of

household waste generated is disposed in landfills and 16 % is incinerated. Some member states like Sweden, Denmark or France use mainly incineration whereas other countries are relying solely on landfilling. The remaining waste is either thermally recovered or recycled and composting plays only a minor role. Municipal waste consists mainly of paper and board or organic material each of which over 25 % of the total. Considering recycling, paper and glass play a major role, while metal and plastics are recovered to a lesser degree[Eurostat.2003]. The data above show a mixed picture regarding the success of EU waste policy. The policy failed to reach the very aim of the waste hierarchy, because the amount of waste generated increased in all old member states. In case of recovering and recycling the numbers are lagging behind the objectives set in the legislation. The new packaging directive (2004) demands for 2008 a minimum recovery rate of 60 % and a minimum recycling rate of 55 % for all packaging waste. For glass and paper there is prescribed a minimum of 60 %, for metals 50 % and for plastics 22.5 % [2004/12/EC.Art 6]. The amount of waste disposed declined slightly from 374 kg/capita (1994) to 367 kg/capita (2003). There was a shift from landfilling (-34 kg/capita) to incineration (+ 27 kg/capita) [Eurostat.2003]. The amount of biodegradable waste disposed in landfills is of major concern. The landfill directive of 1999 prescribes that from 2010 solely pre-treated waste can be landfilled and by 2020 only 35 % of the biodegradable waste can be placed in landfills [1999/31/EC.Art 5].

The waste hierarchy as a fundamental principle reflects the normative approach of the EU towards environmental policy. Maximum environmental protection is the desired policy outcome, and its realisation is limited by available funding. In case of waste management, this means that the method preferred is the one ranking highest in the hierarchy. It implies that waste management should strive for maximum reuse, 100 % recycling and prevent landfilling. It is often neglected that recycling also create environmental pressure through increased transport and consumption of energy and water. The waste hierarchy does not provide the answer the question regarding the socially most desirable method or mix of methods. Until recently, the EU had not scrutinised its policy proposals against economic, social and environmental gains and losses. Recycling targets were the result of experts proposals brought forward by the Commission's DG for Environment watered down during the EU decision making process [Fischer.2002.96]. For decision makers

on the ground the question is how to find the nationally or locally optimal mix of waste policy. The waste hierarchy or prescribed quotas present 'one-size fit-all' solutions, which are difficult and costly to implement. Local decision makers often apply cost-benefit analysis [Wilson.2000.340].

Confronting the waste hierarchy with the results of cost-benefit analysis questions shows different results. Depending on the geographic and economic conditions there can be different optimal methods or in other words: there is no ideal European waste management method. The essential question whether to incinerate or to landfill is a choice depending on the waste composition, the price of land and the density of population. For urban areas incineration with energy recovery is usually the preferable method whereas rural areas benefit from landfills [Ackerman.2002]. Both systems also react differently to increasing recycling quotas. Incinerators are most cost-efficient when treating the maximum amount of waste, and in case of energy recovery, the costs per Mg increase when diverting paper and plastics from the waste stream. Landfills gain from reduced incoming waste, as their capacity lasts longer especially as paper and plastics are the most voluminous kind of waste [Porter.2002.56ff]. The landfill directive contains a de-facto duty to incinerate (composting is usually too expensive) meaning that majority of regions have to rely on a much more expensive disposal method [Pearce.2005.100].

A point of criticism are the recycling quotas set in the packaging directive. It is generally agreed that the marginal costs of recycling are increase with the amount of material recycled. Secondly the optimum recycling quota differs between the different kinds of waste and depending on the cost factors [Rasmussen.2005.15ff]. Most studies show that the quotas set in the new packaging directive are exigent and that the additional costs are not offset by the environmental gains. There are estimations that the EU will face welfare losses through the new recycling quotas of more than 3.2 bn € per year. The main problem is the recycling of plastics which presents a problem regarding the input (collecting, sorting, cleaning) as well as the output (limited market for secondary plastic granulate). The exorbitant costs of the German waste recovery and recycling system *DSD* derive mainly from the plastic fraction [OECD.1998.39]. The discussion should not be about the level of fixed recycling quotas set by Brussels, but implementing a policy that is moving away from fixed targets and command and control structures to economic tools. Price incentives to move waste upwards a social-cost

compatible waste hierarchy, will encourage citizens and waste industry to use more eco-efficient ways to manage waste [Porter.2005.40f].

Municipal waste management in Poland

The current state of Polish municipal waste management is the result of three general trends. The first is the legacy of real-existing socialism. Waste management meant that waste and litter were moved out of town and disposed in old quarries or wasteland close to settlements. The waste dumps usually received household and industrial waste likewise and are counting for many of Poland's brownfield sites. Efforts of reducing the waste stream and recycling were a result of the economy of scarcity and not ecological considerations. During the transition period state run recycling schemes disappeared. In 1990 the newly established municipal self-governments became responsible for waste management and statistically there was one landfill (ca. 100). for 2 ½ municipalities (2 489) [GUS.2003.Tab300]. Municipalities neither received sufficient funding nor the necessary property (buildings, land) for fulfilling these tasks. Generally waste management received only very little attention in the national environmental policy due to the high number of other hazardous environmental problems. In the 'New Ecological Policy' of 1991 waste management was the mid-term aims which were to be tackled in the mid-1990s [Zegar.2003.81].

Only in 1996 a sufficient legal basis for municipal waste management was established, with the 'Act on Self-government' and 'Act on Waste'. The first law led to the transfer of property to municipalities and created the legal framework for waste fees. The second act aligned Polish waste management with EU standards, requiring the formulation of waste management plans on local, regional and national level and establishing the waste hierarchy in Polish law [Anders.2000.274f]. Previously, household waste management was financed through public funds. The introduction of fees for household waste met severe resistance in many areas and fly tipping is still a widespread phenomenon [Lorek.2002.98]. The pressure on municipalities to modernise their waste management system and the fact that most of landfills do not fulfil existing legal standards accelerated the modernisation process. There are a number of successful cases regarding the

introduction of modern waste management in Poland [Jaroszewicz.2001] [Grodzińska-.2003].

Poland had to transpose the 'acquis communautaire', which was reached with the 'Act on Waste' and the 'Act on Packaging and Packaging Waste' from 2001. During the accession process, it became clear that many problems of waste management were going back to the weak enforcement of existing legislation. The European Union provided therefore substantial financial support and to improve the capacity to plan and supervise waste management. It was estimated that fulfilling the membership criteria in waste management would cost Poland about 3 800 M. € [Żylic.2003]. Taking into account this massive financial burden and the severe budget constraints bodies of self-government are facing, the 15 member states granted Poland the greatest number of transition periods in the sector of waste. These cover the directives on: packaging and packaging wastes; landfills; shipment of waste; integrated prevention and pollution control. Poland has to fulfil for 2005 a total recovery quota for packaging waste of 37 % (for plastics and metal min. 15 %) and at least 30 % of waste landfilled must comply with EU standards. The other two transition periods are resulting to a de-facto exclusion of Poland from the internal market for waste. This is to prevent that foreign waste is disposed or treated in facilities not complying EU standards [BMU.2004.47ff].

Over the last 15 years, the consumption patterns changed significantly and accordingly also the generation of waste. In 1990 each Polish citizen produced, in average, about 260 kg of waste; in 1999, 319 kg/capita and for 2003 the number decreased to 260 kg [GUS.2003.Tab309]. This should not mislead about the amount of waste produced, as the total volume increased. Ash from coal fired heating and bio-degradable waste have declined, whereas the amount of packaging increased and accounted for 30 % of the weight and 50 % the volume [Żakowska.2000.15]. With the 'Act on Packaging and Packaging Waste', a system for the recovery and recycling of waste was established. According to the principle of producer responsibility for each kind of packaging brought on the market, recycling fees have to be paid. These fees are distributed to the municipalities for collection and segregation of waste, and to the Funds of Environmental Protection for financing environmental investments [Ziaja.2002.32ff]. Unlike in other countries, the system is not based on a monopolistic recovery organisation, but allows for the competition between different companies. Companies not fulfilling their obligation

of recycling have to pay production fees to the regional self-governments. The level of these fees is set by the Ministry of Environment and depends on the kind of waste and the targeted recycling. For the first two years the system shows positive results and the recycling quotas for all kinds of materials exceeded the quotas planned by the Ministry. For 2003, 53 % of all paper packaging, 27 % of aluminium and 20 % of glass packaging were recycled [MOŚ.2004]. For the future it will be more difficult to exceed the quotas set, because the majority of packaging waste was collected from retailers and enterprises. Extending the collection over households will lead to a significant increase of costs

Critical remarks to the waste hierarchy in Poland

In Poland there is a significant number of publications dealing with the financial and legal aspects of implementing a EU conform waste management. It is striking that the elementary questions of optimum recycling quotas, percentage of waste land filled or number of waste incinerators to be constructed is hardly raised. In 2001, a study about the benefits of environmental 'acquis' for the acceding countries was published. It says that the improvement of environmental conditions through waste management gives, for the period 2000-2010, a monetised benefit of 1 600 to 26 300 M. €.[2] [ECOTEC.2001] Comparing this with the total costs of 3 800 M. € leads to the assumption that most likely it will pay off. But if the question is formulated in the sense of cost-efficiency i.e. is waste management the most efficient way to improve the environment, the picture looks differently. The Polish government estimated that waste accounts for ca. 12 % of the environmental expenditure [Żylic.2003.151]. The ECOTEC study estimates that 4–12 % of the environmental benefit in Poland will come from investment into waste management. Investments into the improvement of air quality show much better results. Due to the rules of the internal market the public side can give only very limited state aid to polluting industries.

Looking at the cost factors for recycling, incineration and landfill it is clear that a socially desirable waste management should be different between the member states. Poland has significantly lower costs for labour and land,

[2] The huge margin between minimum and maximum estimation reflects the methodological uncertainties.

its costs for energy are comparable to Western Europe and the costs for capital are significantly higher. Generally this cost-structure, which will remain like this for several years, favours labour and land intensive methods, like landfills and low-tech segregation plants. Capital intensive incineration is hardly feasible in Poland, except of the Warsaw agglomeration. A further aspect questioning the waste hierarchy is the question of social equity. How much should people spend on waste management and who should pay for it? The WHO states that the should not exceed 1 % to 2 % of the disposable income [Lorek.2002.250]. The costs for waste management borne by a household are fees paid to the municipality for the collection, and the product fees for the packaging, included in the price of goods. This amounts to ca. 64 PLN per year or 0.53 %of the disposable annual net income[3] and can be considered as socially acceptable. Considering the estimated investment of 3 800 mln. € or roughly 4 000 PLN/capita we can expect that the number will exceed the willingness to pay. Waste management fees are functioning like environment poll taxes, with the exceptions of costly PAYT (pay as you throw) schemes. The product fees depend on the amount of goods consumed, with food packaging having the major share. Low income households spend a higher percentage of their income on food and therefore also a higher share on product fees. EU funding for financing these investments is only to a limited extend available and increasing public debt is in conflict with the Maastricht criteria.

Conclusions and policy proposals

This paper presented the main legal and economic issues of waste management in the European Union and in the new member state Poland. From an environmental economist point of view the many of the policy aims and their outcomes can be considered as not beneficial for the society. The question is now how to prevent Poland to follow the same path. Firstly economic tools like price incentives and a system of environmental taxes should be applied and not command and control mechanisms. Polish waste management policy should be based on cost-benefit studies, which provide the decision makers with a sound basis to take decisions regarding investment and new legislation. The central government should leave lee-way for the

[3] 40 Złoty per person for collection (3 persons one 110 l) bin and 24 Złoty for packaging recycling and recovery. The fees are based on the costs in the district of Żywiec, which is considered to have the best operating waste management system, with high recovery quotas and efficient collection. The packaging fees are calculated on the basis of estimated amount of packaging per capita for 2005 [Grodzińska.2004.213] and the production fees for 2005. The numbers contain great methodological weakness and should be taken only indicative. Disposable net income per capita for 2003 is ca. 12 050 PLN [GUS 2004].

Local and regional governments to find solutions answering to the problems on the ground. Significantly more research has to be done in this area so that decision makers can communicate their findings to Brussels.

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