

Future policy on solid waste management

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ABSTRACT

The future policy on solid waste started already 15 years ago. At that time the Federal Government of Germany obliged to launch an ordinance on pre-treatment of solid waste before landfilled. In 1992 with the introduction of the packaging ordinance to first step to establish the extended and shared producer responsibility in Germany was done. With the “vision of 2020” introduced to the public in 1999 Germany plan to avoid having any landfill anymore for solid waste.

1. CIRCULAR ECONOMY

Circular Economy (CE) is a future model of economic development which aims at environmental protection, pollution prevention and sustainable development through conversation, reusing and recycling of resources, in order to minimize pollution from the source and reduce overall waste per unit output. Germany started with a law “Kreislaufwirtschaft” in 1996 which is already a step forward to Circular Economy which in cooperates more than that what is covered by the German law.

Circular Economy is a concept that is transforming traditional pattern of economic growth and production.

The conventional perception of the economic system is that it is linear. The linear system is converted to a circular system, when the relationship between resource use and waste residuals is considered [Andersen 1997]. The basic idea is to consider the externalities and give them a price f. ex. by taxation of the external costs. This will result in:

1. Reflection of the external effects in market price and will result in a common understanding that the environment is not a free good.
2. Improvement to reduce the production of waste.
3. Recycling of waste and reduction of raw material from natural resources.
4. Flexible adjustment of companies to find their own solution to minimize the impact of externality taxation.

To establish a new economic development pattern means either upgrading or replacing the existing production pattern. But it is not only the production which actually changed already a lot to cleaner technology, it also has to change the pattern of consumption.

The first step to change consumption pattern is the packaging ordinance which give incentive to the producer and the consumer to avoid expensive packaging.

Examples in Germany show, that the reduction of packaging waste amounted to 1 mill Tonne or approx 10 % of all material.

2. RESULTS AND FUTURE GOALS

2.1 Description of the hazardous waste developments in a Federal State by means of the waste utilisation and avoidance potentials according to the actual state of technology

The objective of this study (Bilitewski et. al. 1996) consisted in the establishment and description of the hazardous waste developments in the participating industrial enterprises for a prospective period of 5 years, starting from the hazardous waste generation and substance flows of the year 1987, and to assess them against the theoretical possibilities for the minimisation of these waste. This investigation marked the first study of this kind in the German speaking countries. The novelty of the approach consisted in the attempt to analyse the future hazardous waste developments of three industrial branches in co-operation with part of the respective enterprises on the basis of their investment and production planning until the year 1993.

The measures investigated at the participating industries were compared with the theoretically derived waste utilisation and avoidance potential according to the actual state of technology. This comparative approach offers politics further possibilities for an intervention in order to achieve the waste management objectives and thus to overcome the existing shortcomings (insufficient capacities for the treatment and disposal of these wastes, lacking management concepts, missing information as regards the generated amounts, origin and disposal routes used) with regard to the proper management and disposal of hazardous waste materials.

The first phase of the investigations comprised the analysis of the waste disposal structures (hazardous waste types, quantities and substance flows), the environmental impacts arising from the use of these waste disposal options and the basically/theoretically existing possibilities for the avoidance, secondary utilisation and hazard minimisation of these wastes.

In the second phase, the investigations focused on the hazardous waste developments for the period from 1987 until 1993 in the three industrial branches concerned, considering in particular the potential measures with regard to

- avoidance,
- substitution,
- secondary utilisation and
- hazard reduction,

which should lead to changes of the hazardous waste amounts generated. The data for this kind of analysis were obtained from the participating enterprises in consideration of their individual production schedules for a prospective time period of five years. They show the anticipated developments of hazardous waste generation and could be set in relation to the enterprise's planned measures for the avoidance and secondary utilisation of these wastes.

Based on the findings from the first and second project phase, the theoretical waste utilisation and avoidance potential could be established and assessed.

Results

Figure 1 gives a summarised view on the results of the above study. For the period from 1987 until 1993, a reduction of the hazardous waste generation by about 41 %, i.e. from 74,950 Mg/a to 44,100 Mg/a had been established. Theoretically, a reduction up to 31 % of the previous quantity should be possible.

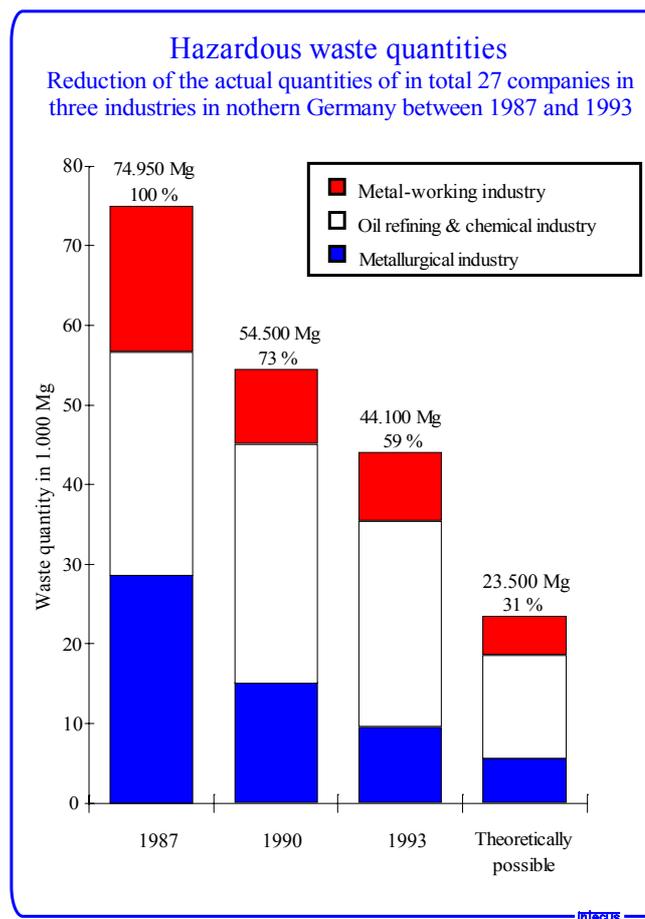


Figure 1. Development of hazardous waste quantities considering different measures for waste avoidance and utilisation of the industry.

The principal reasons for this high reduction rate over the years can be found in:

- the high costs for the disposal of hazardous waste materials,
- the increased economic efficiency in employing waste avoidance measures,
- ever stringent provisions made by the authorities, limiting values and permitting reasons and
- security as regards the handling of such waste due to an increasing independence from specific treatment facilities and waste transporters.

The investigation concerning the avoidance of hazardous waste materials came to results regarding the percentage reduction of future hazardous waste generation as shown in table 1.

Table 1. Future reductions of hazardous waste material.

Waste type	Reduced generation within the time period 1983 - 1999
Sulphur-containing wastes	80 %
Oil-containing wastes	40-50 %
Old paints and lacquers	60-70 %
Organic solvents (free of halogens)	70-80 %
Wastes from electroplating	60-70 %
Salt slags	100 %
Other residual waste	Small
Total waste	50-60 %

According to that data, hazardous waste generation will be reduced by 50-60 % of the original amount in the year 1983 until the year 2000.

Following hereafter, the balance concerning the disposal of hazardous wastes from selected enterprises within the years 1987 and 1993 will be shown. What can be especially noted beside the reduction of the total amount of generated hazardous waste is a significant decrease of the proportion of hazardous waste brought to landfills from more than 50 % in the year 1987 to about 25 % in the year 1993.

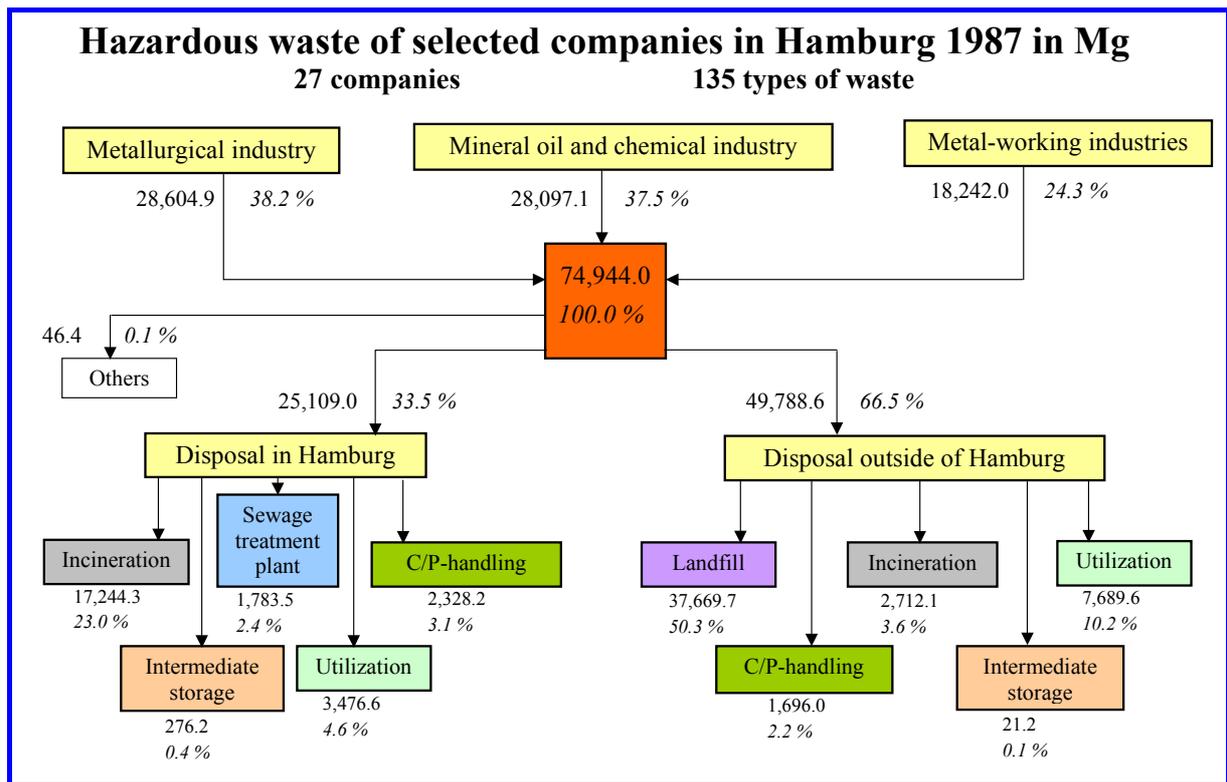


Figure 2. Generation and disposal of hazardous waste from selected companies in Hamburg in 1987.

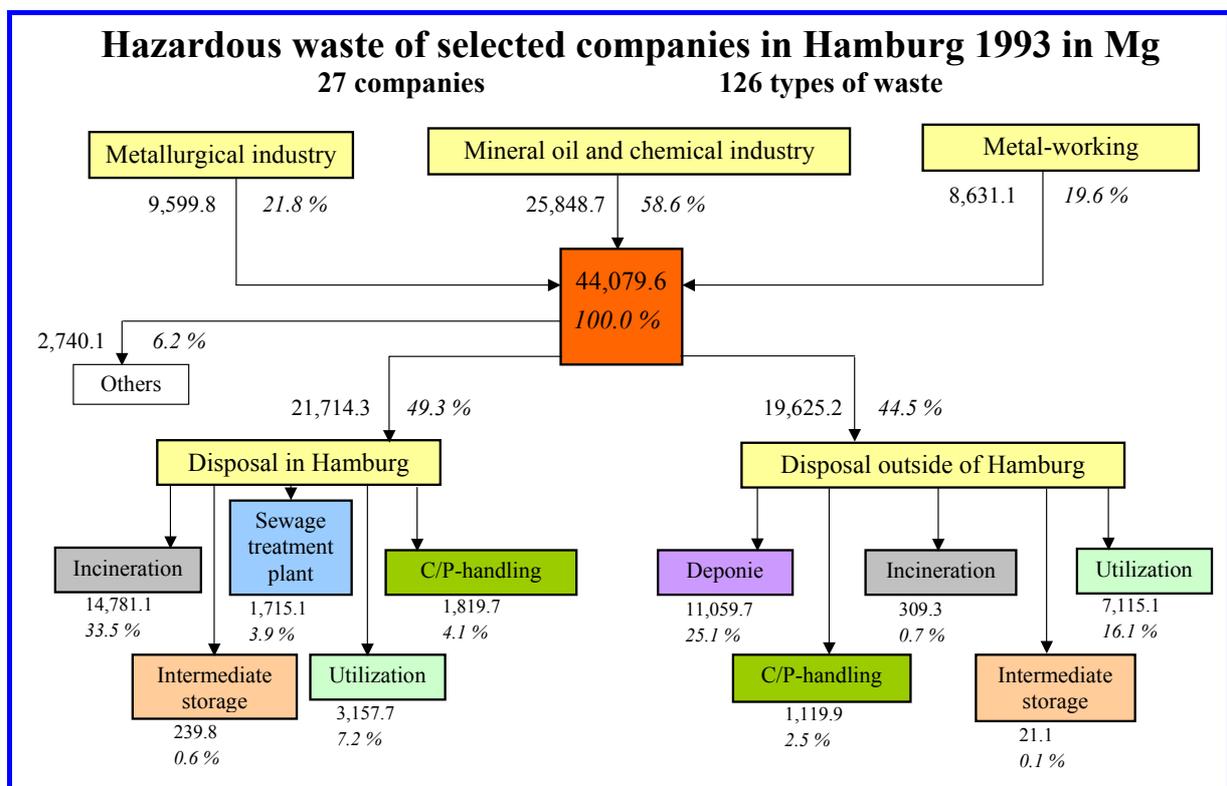


Figure 3. Generation and disposal of hazardous waste from selected companies in Hamburg in 1993.

2.2 Pilot Study on Waste Avoidance in Hamburg-Harburg

This study was conducted in 1987 by the INTECUS Environmental Consulting Firm, in cooperation with the Recycling-Center in Harburg under contract with the City of Hamburg-Harburg Waste Authority.

The study was initiated to identify how consumers obtain and use information on household-waste reduction. In addition, the effects on the quantity and quality of discards, recyclables, and problematic materials were to be evaluated. And finally, a certain degree of confidence was to be achieved so that the obtained information could be applicable to other studies.

Planning and Implementation

Eigthy-one households were chosen for this project to study the possibilities of focused waste avoidance. The study was conducted in order to study the possibilities of targeted waste avoidance, aside from the already ongoing source separation of recyclables and problematic materials.

The test homes were selected to represent various types of residential settings within the urban region of Harburg. Prior to beginning the study, a questionnaire was circulated inquiring about socio-economic conditions, attitudes toward waste management, and environmental awareness. The study covered 6 specific time periods during regular intervals in 1987. To assist in motivation during the entire study, participants were involved in personal contacts and group discussions. They were also provided with informational brochures on waste avoidance and alternative shopping methods.

Based on experiences gathered from the Berlin study, participants were given avoidance advice for specific waste groups. This involved a practical comparison of recyclable and nonrecyclable products and providing suggestions for substitutions of the nonrecyclables. In addition, the participants received concrete ideas on waste avoidance measures such as:

- Paper and paperboard products that are combined with other materials (i.e., to make composite materials), should be avoided. Beverage containers made of glass, in particular returnable bottles, should be purchased instead.
- Disposable dinner-ware such as paper cups, paper plates, etc., should be avoided.
- Returnable bottles should be preferentially chosen since they are reusable up to 60 times each.
- Plastics storage bags should not be used. Instead leftovers and foods can be stored in reusable containers. Various canned goods should be avoided. Beverages can be purchased in returnable bottles. Canned foods should be avoided and instead fresh foods or home canned goods can be used.
- Organics waste can be biodegraded in worm composters in apartment balconies or small spaces. Information on this methodology can be obtained from local agricultural agents or garden centers.

Results

Waste avoidance resulted in an overall 30 % reduction in discards. The reduction in the quantity of discards appears to be dependent on reducing the amount of organic materials. In comparison to the noncomposters, the composters (27 % of the participants) were able to show a decrease in the amount of vegetable matter.

Numerous PR campaigns promoting home composting have shown that only a minimal effort is needed to cut down a considerable amount of household waste. For example, when the City and suburbs of Munich provided free backyard composters to interested residents, a 10 to 20 % reduction in discards was observed.

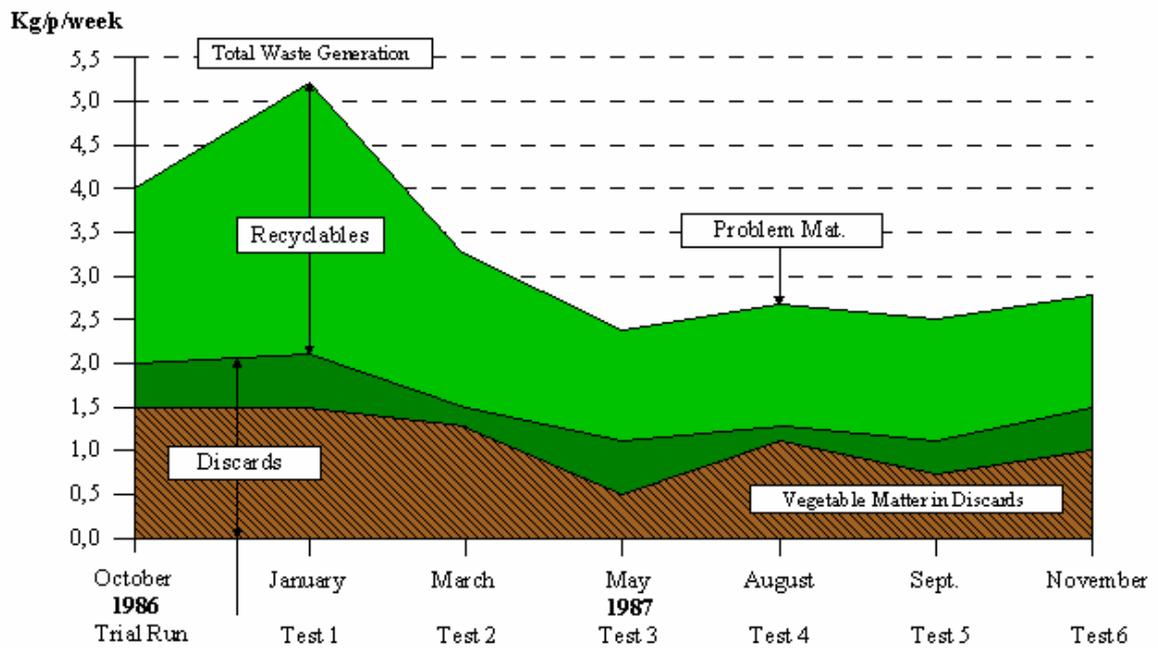


Figure 4. Total waste generated during each testing period (Bilitewski et. al. 1996).

Furthermore, considerable quantities of recyclables were avoided in the main categories of paper, paperboard, and glass. The higher avoidance rates for glass can likely be attributed to switching to returnable bottles. The higher rates for paper are likely because of changes in attitude toward packaging materials as well as the increased use of recyclables containers.

3. SUMMARY

With the new idea to avoid any landfilling of waste the German government will promote the reduction of waste and the efficiency of resources. Industry is able to disorient GBP growth from production of waste.

In the consumption it is more difficult. Vogel (2006) has shown on the example of Vienna that even an optimistic approach for avoidance of waste will end up in a growth of the total amount of waste of approx 6 % until the year 2010 as shown in Figure 5.

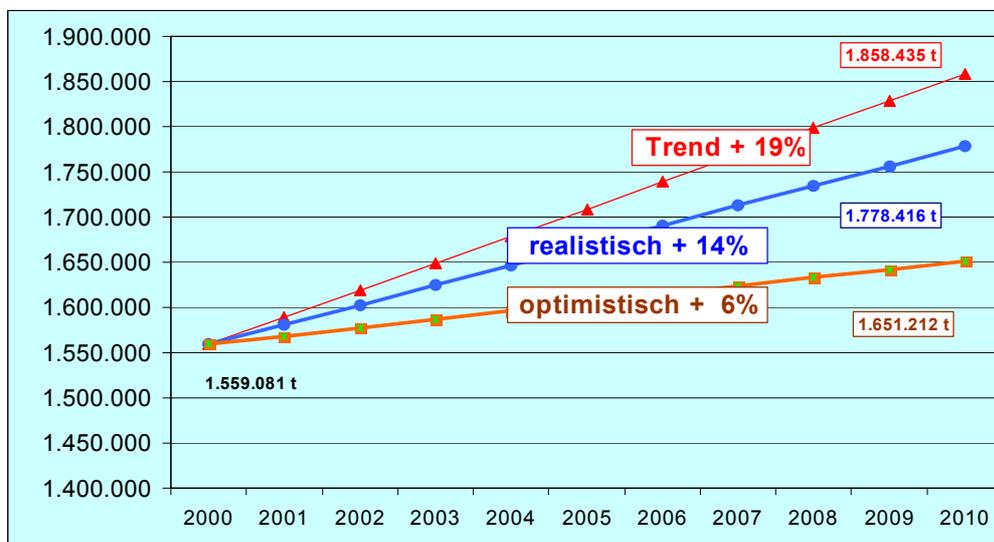


Figure 5. Development of waste (Mg/y) in Vienna until the year 2010 corresponding to different waste avoidance strategies (Vogel 2006).

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