WASTE MANAGEMENT IN AUSTRIA
GHG MITIGATION EFFECTS OF THE LANDFILL REGULATION

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Abstract: *In 1990, methane (CH_4) emissions from waste management sources in Austria amounted to 6.2 mill t CO_2 equivalent. This was the highest level ever measured from the sector, but emissions could be reduced considerably in the years following. In 1998 emissions amounted to 5.2 mill t (minus 16 %) and the trend analyses prospects a further significant reduction until 2010, not only of methane but also of CO_2 emissions from other sectors (households, energy, industry).*

CH_4 emissions from waste management are a consequence of Total Organic Carbon (TOC) of waste fractions disposed on landfills. The landfill regulation sets very strict limits in this respect.

The effectiveness of the landfill regulation is supported by a landfill charge with rising rates between 1997 and 2001.

Landfill management (private and municipal) will has to fully comply with the high standards of landfill regulation as of 2004 (in certain circumstances 2008). The regulation will has most impact on the treatment of residual waste (from households and similar fractions from businesses). Around 30-50 % of total emissions (CH_4 and CO_2) from waste management are currently caused by residual waste. Between 1990 and 1996, total emissions from residual waste treatment where reduced by 21.5%, and the landfill regulation is expected to cause a further 20 % reduction until 2010, taking into account avoided emissions from other sectors. That amounts to 0.9 Mio t CO2 equivalents or 41.5 % compared to 1990 levels.

GHG Emissions Influenced by Waste Management in Austria

Current trends in CH_4 emissions

In 1990, methane (CH_4) emissions in Austria reached a level of 11.3 mill t CO_2 equivalents. This was a share of around 15% of total GHG emissions (six Kyoto gases). In contrary to the general trend in GHG emissions in Austria, CH_4 emissions fell continuously in the following years, amounting to 9.75 mill t CO_2 equivalent in 1998 (latest data available).

CH_4 emissions are mainly caused by waste management and agriculture. The waste management share of total CH_4 emissions is more than 50%.

Current emissions trends in waste management

In 1990, CH_4 emissions from waste management sources in Austria amounted to 6.2 mill t CO_2 equivalent. This was the highest level ever measured from the sector, but emissions could be reduced considerably in the years following. In 1998 emissions amounted to 5.2 mill t (minus 16 %) and the trend analyses prospects a further significant reduction until 2010, not only of methane but also of CO_2 emissions from other sectors (households, energy, industry).

Considering that in 1990 the new Waste Management Act entered into force, this positive trend is not surprising, although the encouraging extent of reduction was not expected by experts. The success is mainly due to improved landfill recovery, and rising quota of separate collection and treatment of waste (e.g. packaging waste, bio waste).

Waste management, namely waste incineration, has significant influence on CO_2 emissions also, both in a positive and negative way. Combustion of plastics (and co-firing of fossil fuels) causes additional CO_2 emissions, but it avoids long term CH_4 emissions from organic carbon. When the incineration plant is equipped with CHP technology, waste incineration also avoids large quantities of CO_2 emissions in other sectors (households, energy industry). On condition of energy efficiency and other high technical standards, which reduce „traditional“ pollutants to an absolute minimum (environmental impact assessment!), incineration seems to be the environmentally most attractive way of residual waste[1] treatment.

[1] i.e. waste from households and similar waste fractions from businesses after separation of matters for recycling.

Legal Framework

Waste Management Act 1990

Overall targets

1. minimisation of waste management's impacts on humans, fauna, flora and natural environment;
2. preservation of energy and other resources;
3. minimisation of landfill volume;
4. final disposal of waste only when guaranteed, that following generations will not being endangered.

Leading principles

1. prevention of waste production;
2. waste utilisation (recycling or incineration with energy recovery);
3. controlled disposal of waste, which cannot be utilised (after biological, thermal or chemical-physical treatment).

Landfill Regulation 1996

The landfill regulation is the most important instrument to implement the overall targets of the waste management act (see above).

Leading principles

1. reduction of total organic compounds and minimisation of total volume of landfills as a direct consequence;
2. classification of landfills (e.g. demolition waste, residual waste etc.);
3. no final deposition without prior treatment, which reduces reactivity of waste (e.g. mechanical-biological treatment);
4. high technical standards for landfills to minimise impact on environment.

Scope

- residual waste from households and similar waste fractions from businesses (trade and industry), which did not end up in recycling processes;
- construction and demolition waste;
- excavated soil (from construction etc.);
- mass waste (i.e. large quantities of homogenous waste with limited content of pollutants).

The scope does not cover, for instance, hazardous waste, sewage sludge or industrial waste (as far as not residual waste).

Landfill Charge Act 1989 (Contaminated Sanitation Act)

Leading principles

1. disposal of waste on landfills is subject to a charge
2. rate of charge depends on type of waste
3. charge raised step by step between 1997 and 2001
4. supplemental charges for disposal on landfills without gas recovery
5. revenue of charge earmarked for clean-up of contaminated land

Relevant EU Directives

Directive 75/442/EEC on Waste
Directive 99/31/EC on Landfills

The leading principles are comparable to Austrian waste management law, although most Austrian standards are by far stricter than those on community level. This does not cause legal conflicts, as far as domestic provisions do not distort competition in the common market.

Direct and implicit consequences of the landfill regulation

Methane emissions from landfills are a consequence of Total Organic Carbon (TOC) of waste fractions disposed on landfills. The landfill regulation sets very strict limits in this respect. For residual waste landfills, TOC may not exceed 5 Vol.%. As a consequence, no residual waste (from households and comparable fractions from businesses) may be disposed without prior treatment (mechanical, biological, physical).

Landfill management (private and municipal) will has to fully comply with the high standards of landfill regulation as of 2004 (in certain circumstances 2008).

Consequences for residual waste treatment

The regulation will have most impact on the treatment of residual waste (from households and similar fractions from businesses). Around 30-50% of total emissions (CH_4 and CO_2) from waste management are currently caused by residual waste. Between 1990 and 1996, total emissions from residual waste treatment where reduced by 21.5%, and the landfill regulation is expected to cause a further 20% until 2010, taking into account avoided emissions from other sectors. That amounts to 0.9 Mio t CO_2 equivalents or 41.5% compared to 1990.

The effectiveness of the landfill regulation is directly supported by the landfill charge. The charge for residual waste currently is 400 AS (30 Euros) per tonne, and will be raised to 600 AS (44 Euros) by 1 Jan 2001. A supplemental charge of 400 AS applies, when the landfill is not equipped with a landfill seal, and another 400 AS for landfills without landfill gas recovery of current technical standard. On „worst case“ landfills, which rarely exist

anymore, the charge can therefore sum up to 1 200 AS (88 Euros) per tonne (1 400 AS as of 2001).

The high costs of full compliance with the landfill regulation in combination with the landfill charge will implicitly make waste utilisation (recycling and incineration with energy recovery) economically more attractive.

The role of incineration

In 1996, 33.5% of residual waste was combusted in incineration plants. In the expected scenario for 2010, 50% of residual waste will be incinerated, and the other 50% will be subject to mechanical-biological treatment. Full compliance with the landfill regulation will effectively ban further deposition of untreated residual waste after 2004. Residual matter from thermal or mechanical-biological treatment will has to be disposed on mass waste landfills with very limited content of methane gas and other pollutants.

In other scenarios, e.g. higher energy efficiency of incineration plants and landfill gas utilisation, or higher share of waste incineration at all (60% could be realistic), GHG mitigation could even be more successful.

Questions/Summary

1. *How does the described policy help to achieve the emission reduction in the waste management sector and why is it considered better than other policies and measures?*

   Austrian waste management policy is committed to targets and principles which generally support GHG reduction. The regulatory character of waste policy is complemented with market based elements, which strengthen the polluter pays principle (e.g. the landfill contribution, packaging waste contributions). A different policy for the sector could only be of more voluntary character combined with higher environmentally differentiated charges. However, given the high risks attended with waste management for natural environment and future generations, we do not regard a more voluntary approach as appropriate, and it also would not necessarily be more cost effective. To reach a certain target the technical standards required have to be fulfilled anyhow - or policy makers run risk to fail the target. Therefore, a combination of „command and control“ and market incentives seems to be more on the safe side, both in terms of GHG reduction and responsibility for future generations.

2. *What are the criteria used to characterise the best practice and what are the methodologies used to assess these criteria?*

   All main principles of Austrian waste management policy contribute to GHG mitigation, but this is not the only criterion. Others are, e.g. minimising risks for future generations, or saving resources. Without doubt, “very best practice” is avoiding waste at all. The second best choice is recycling and thermal utilisation (incineration with energy recovery) of waste, which is not only avoiding methane emissions from landfills, but

also CO_2 emissions from other sectors. "Worst practice" - deposition on landfills - cannot be avoided at all (e.g. residual matter from prior treatment), however, it can be managed in a way, that secures a high technical standard in terms of reduction of pollutants, utilisation of landfill gas and minimisation of risks for coming generations. The methodologies to assess the criteria (i.e. GHG mitigation) are: Observation of the development of landfills (reduction of total volume as expected?), development of incineration capacities, development of total residual waste. In case of deviation from expected figures, possibility of legislative amendments (e.g. raising landfill charges, raising public funding to support scheduled trends)

3. *What are the barriers addressed by the best practice?*

   The main barrier of GHG minimising waste management is high costs both to fulfil the required technical standards for landfills and to construct and economically run waste incineration plants. A danger, which has to be addressed effectively, is therefore a delay of the implementation of the regulation. The landfill charge addresses this barrier to a certain extent but it could become necessary to either raise the charge or give concentrated public funding for standard raising activities, closure of landfills and investments in incineration plants.

4. *What is the interaction of this best practice policy with other policies?*

   The policy clearly supports avoidance of CO_2 emissions in other sectors, namely households, industries and electricity production.

5. *Greenhouse gases affected, sectors addressed, time scale of implementation, funding:*

   The measures directly affect CH_4 and CO_2, and indirectly CO_2 (avoidance).
   The sectors addressed are waste management, households, energy industries, industry.
   Implementation: currently, with deadline 2004 to get in line with landfill regulation.
   Funding: could become necessary to keep in line with time schedule.

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