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Landfill reduction experience in The Netherlands

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ABSTRACT

Modern waste legislation aims at resource efficiency and landfill reduction. This paper analyses more than 20 years of landfill reduction in the Netherlands. The combination of landfill regulations, landfill tax and landfill bans resulted in the desired landfill reduction, but also had negative effects. A fierce competition developed over the remaining waste to be landfilled. In 2013 the Dutch landfill industry generated €40 million of annual revenue, had €58 million annual costs and therefore incurred an annual loss of €18 million. It is not an attractive option to prematurely end business. There is a risk that Dutch landfill operators will not be able to fulfil the financial obligations for closure and aftercare. Contrary to the polluter pays principle the burden may end up with society. EU regulations prohibiting export of waste for disposal are in place. Strong differentials in landfill tax rate between nations have nevertheless resulted in transboundary shipment of waste and in non-compliance with the self-sufficiency and proximity principles. During the transformation from a disposal society to a recycling society, it is important to carefully plan required capacity and to guide the reorganisation of the landfill sector. At some point, it is no longer profitable to provide landfill services. It may be necessary for public organisations or the state to take responsibility for the continued operation of a 'safety net' in waste management. Regulations have created a financial incentive to pass on the burden of monitoring and controlling the impact of waste to future generations. To prevent this, it is necessary to revise regulations on aftercare and create incentives to actively stabilise landfills.

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1. Introduction

European waste policy encourages recycling and recovery and discourages disposal. The European Waste Framework Directive (EC, 2008) defines recycling as 'any recovery operation by which waste materials are reprocessed into products, materials or substances whether for the original or other purposes'. This does not include energy recovery, reprocessing into fuels or backfilling operations. The Waste Framework Directive defines recovery as 'any operation the principal result of which is waste serving a useful purpose by replacing other materials which would otherwise have been used to fulfil a particular function, or waste being prepared to fulfil that function, in the plant or in the wider economy'. The Waste Framework Directive defines disposal as 'any operation which is not recovery even where the operation has as a secondary consequence the reclamation of substances or energy'. Incineration with limited energy recovery and landfill fall under the definition of disposal. In order to promote the principles of self-sufficiency and proximity, the Waste Framework Directive demands Member

States to establish an integrated and adequate network of waste recovery and disposal installations.

The European regulation on shipments of waste (EC, 2006) requires that export of waste for disposal should only be permitted when in accordance with the principles of proximity, priority for recovery and self-sufficiency at European Union and national levels. In other words if a European member state has sufficient landfill capacity, but limited recovery capacity, it would be acceptable to export waste to another country for recovery, but not for disposal.

In various countries around the world waste policies aim at 'zero waste' and 'resource efficiency'. For instance the Environment Action Programme to 2020 'Living well, within the limits of our planet' (EC, 2012) of the European Commission aims to support 'the shift towards an economy that is efficient in the way it uses all resources, decouples absolutely economic growth from resource and energy use and its environmental impacts, reduces greenhouse gas emissions, enhances competitiveness through efficiency and innovation and promotes greater energy security'. One of the waste management targets in the Environment Action Programme to 2020 is to 'virtually eliminate landfilling by 2020'. This is a much stricter landfill diversion target than the current targets in Directive 1999/31/EC (EC, 1999) known as the Landfill Directive.

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The landfill reduction targets in the Landfill Directive require the EU Member States to reduce the landfilling of 'biodegradable municipal waste' to less than 35% of the amount produced in 1995. Waste data (e.g. EEA, 2009) indicate that some member states will have difficulties or will fail to achieve these targets. At the same time there is a group of member states (Austria, Belgium, Denmark, Germany, Netherlands) that have already moved far beyond the targets of the EU Landfill Directive. Some of these member states landfill less than 5% of the total waste generated. It could be stated that they have already reached 'virtual elimination of landfilling'. The experiences of these EU member states in achieving their low landfill rates are poorly documented in the open literature. The objective of this paper is to disclose some of the Dutch experience and allow other nations to avoid negative effects of an otherwise desired development.

2. Approach

This paper provides an analysis of 20 years of landfill reduction policy in the Netherlands. Statistical data compiled by the Dutch national government have been used for the analysis. Two sources provided most of the information. The *Werkgroep Afvalregistratie* (working group on waste registration) is a cooperation between competent authorities and the waste management industry and led by the national government. Reporting that is required by law is completed with voluntary reporting and published annually. Recently the Ministry of Infrastructure and Environment has commissioned a 'financial quick scan' of the situation in the Dutch landfill industry (Hopstaken et al., 2013). The consultant employed has analysed official documents of the competent authorities and the annual financial reports of landfill operators. In addition the consultant has interviewed both competent authorities and landfill operators. During the interviews confidential financial information on landfill operation was shared with the consultant and aggregated. The aggregated information is described in a publicly available report (Hopstaken et al., 2013) and discussed in this paper. Individual landfills were not discussed and cannot be distinguished in the report. The report does however contain valuable and interesting data on the development of Dutch landfill operation in general.

3. Landfilling in The Netherlands

3.1. Landfilled amounts, landfill tax and landfill bans

Currently the Netherlands landfills 1.5–2 million tonnes of waste annually (Fig. 1). This is only 2–3% of the total waste

generated – some 60 million tonnes per year. Essentially only wastes, for which no recycling or incineration option exists, are landfilled. Landfill bans were first introduced in 1995 and gradually extended to 64 waste categories. Today 61 are in force and 3 more will enter into force when recycling capacity becomes available. Landfill tax was first introduced in 1996 and gradually increased until it was abolished in 2012. It has to be emphasised that landfill tax has played a very important role in achieving the low landfilling rates. Currently Dutch policymakers argue that landfill taxes are no longer important. They state that the combination of landfill bans and available recycling capacity will enable the Netherlands to keep landfill rates low.

In the Netherlands in 2011, there were two tax levels: €108 per tonne for 'combustible waste' and €16 per tonne for 'non-combustible waste'. To make it simple the distinction was based on density. Anything lighter than 1,100 kg per m³ was considered 'combustible waste'. The method used was to determine the weight of a load ((full lorry minus tare weight of lorry) on the weighbridge) and divide the weight of the load by the volume of the lorry or container. To that end all lorry and container volumes had to be determined by an independent, certified authority and clearly indicated on both sides of the lorry or container. The weighbridge operator could easily see the volume indication and enter it into the weighbridge computer and database. In reality not all containers were filled to the brim. The result being that even inorganic material like contaminated soil could administratively be considered 'combustible'. This resulted in protests and court cases and made collection of the tax expensive.

Data on development of the landfill tax, combustible waste landfilled and combustible waste exported are presented in Fig. 2.

It seems that the announcement of landfill bans and taxes resulted in a decrease in landfill of combustible waste in the years prior to 1995. Between 1992 and 1995 alternative treatment capacity became available in anticipation of landfill bans and tax. Municipalities invested in separate collection, composting and incineration capacity. Between 1995 and 2001 landfill was relatively constant despite the increase in landfill tax. Then from 2001 to 2005 there was a strong reduction in landfill of combustible waste. At the same time a steep increase in export of combustible waste occurred. This coincided with an increase of the tax rate from €64 to €80 per tonne. Export permits investigated by DWMA between 2002 and 2008 (DWMA, 2013) clarified that the bulk of the exported combustible waste was officially transported to Germany for recovery. In reality German recovery plants accepted the waste and sent it straight to landfill. It was more attractive to accept higher transport costs to Germany, where there was no landfill tax. The export of combustible waste then sharply dropped

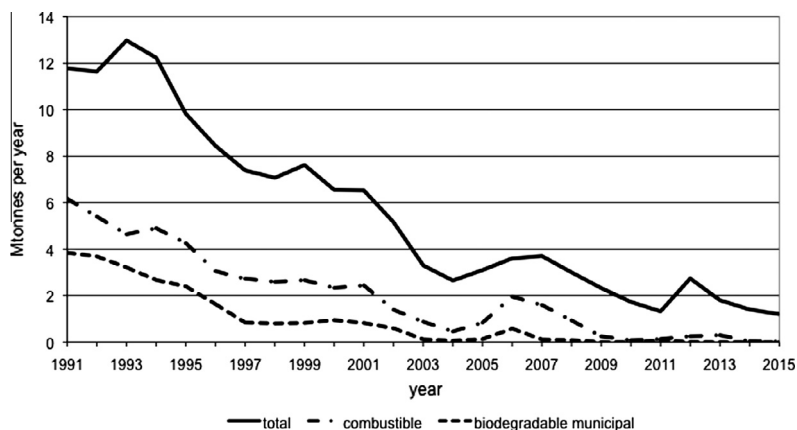


Fig. 1. Development of landfilled waste in The Netherlands (Werkgroep Afvalregistratie 2013; DWMA, 2013).

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