Waste Treatment and Disposal in the European Union

Subjects: Environmental Studies

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Disposal via landfill has historically been the dominant method of municipal waste treatment and disposal in the European Union (EU). The EU's Waste Framework Directive of 1975 (Council Directive 75/442/EEC) introduced the waste hierarchy into European waste policy for the first time, emphasising the importance of waste minimisation. Implementation of the waste hierarchy was optional to member states; but there was an expectation that it would be included within national waste management legislation. The waste hierarchy is a guiding principle that gives top priority to preventing waste; when waste is created, it gives priority to direct re-use, recycling, recovery methods, such as energy recovery, and last of all disposal (Council Directive 2008/98/EC).

municipal waste management recycling circular economy

1. Introduction

In practice most countries have viewed the hierarchy as a "ladder" and have sought to climb it step-by-step from the bottom (landfill) to the top (waste prevention). In fact, there is nothing to stop countries heading straight for the top, skipping multiple steps in one bound.

Due to the ongoing high levels of landfilling across the EU in the early 1990s, and apparent lack of adherence to the waste hierarchy, diversion of municipal waste from landfill became a priority ^[1] and was legally addressed in 1999 by the EU's landmark Landfill Directive (Council Directive 99/31/EC). Specific targets were not set for the overall reduction in disposal via landfill but for the amount of biological municipal waste sent to landfill; by 2020, less than 35% of 1995's biological municipal waste tonnage must be landfilled (Council Directive 99/31/EC). Other EU Directives reinforced the desire to move towards more sustainable resource use and protection of the environment via application of the waste hierarchy. Perhaps the most significant directive is the EU Waste Framework Directive, introduced in 2008, which set an objective that 50% of all municipal solid waste was to be recycled, or composted, by 2020 (Council Directive 2008/98/EC).

However, despite all this legislative activity, there was no guarantee that these targets would be met. In fact, widely different combinations of materials recycling, composting, incineration with energy recovery and the landfilling of residues are utilised for the delivery of waste management across the EU ^[2]. It has been widely reported that Wales is the second best country in the world at municipal waste recycling, just behind Germany and just ahead of Singapore ^[3]; the focus is on why countries achieve their particular recycling rates in details. The combination of methods used by countries depends upon many factors, including the availability of space, finance, technology,

workforce skills and infrastructure, and political willingness to proactively implement the principles of the waste hierarchy.

In the United Kingdom (UK), waste policy is a devolved matter. Political factors that have been shown to have a key influence on solid waste management have been identified as including government stability, corruption, accountability of leaders, local government plans, government priorities, influence of politicians and level of bureaucracy ^[4]. The devolved administrations of England, Scotland, Wales, and Northern Ireland are each responsible for setting their own waste strategy and policy. They have generally focused on improving recycling, mainly because recycling is an obvious way to facilitate a transition to a circular economy and a more resource-efficient society ^[5]. Whilst the core focus of these strategies has been on ensuring national compliance with EU directives, Scotland and Wales have typically chosen to be bolder than England and Northern Ireland by taking ambitious approaches that often exceed the EU's requirements ^[6].

2. Waste Management in England

The recycling rate in England reached 40.3% in 2009/10. Here, the national government aimed to be a "zero waste economy" by 2020 by recognising waste as a resource in-line with the waste hierarchy and to reduce greenhouse gas (GHG) emissions. However, whilst the Waste Management Plan for England 2013 aimed to establish a path towards a "zero waste economy", it did not include any new waste management policies for England. The government adopted a relatively laissez-faire approach to waste regulation and policy in England and only a small number of government-led initiatives were anticipated. These included a plan to improve the quality of recyclates produced at materials recycling facilities, promotion of waste prevention and reduction efforts, and the introduction of a policy for the delivery of major energy infrastructure, including new energy from waste installations (principally advanced thermal treatment technologies). There was a commitment to enhancing the role of anaerobic digestion (AD) in England, with AD recognised as being an effective means of reducing GHG emissions from waste management and supplying renewable energy. Overall, English waste strategy and regulation was chiefly driven by use of the Landfill Tax escalator—an environmental tax designed to help reduce the amount of waste going to landfill—local initiatives and government-issued recycling targets for local authorities. English local authorities were given flexibility in deciding how to meet their targets and the government stated that it would only intervene in waste matters where necessary or where there is a clear market failure. To illustrate, here is a direct quote from the responsible minister, Eric Pickles, from a contemporary newspaper article $\boxed{\mathbf{Z}}$:

"If you want people to do something, then it's always much more effective to give them support and encouragement—a nudge in the right direction—than to tell them what to do and then punish them if they don't obey. Recycling is a case in point. We all recognise that we've got to cut down the amount that gets dumped in landfill. The previous government planned to do that in the most heavy-handed way possible: with bin taxes that would hit people in their pockets with exorbitant fines, enforced by an army of bin bullies to snoop through people's rubbish. In all likelihood, this would have just fuelled fly-tipping, backyard burning and more trips to the dump as people tried to avoid paying the tax."

This hands-off approach failed dismally, as predicted by Farmer et al. ^[8]. England did not meet its target to recycle 50% of household waste (known as "waste from households") by 2020; indeed in 2020, this recycling rate was 44.0%, down from 45.5% in 2019, and just 4% higher than a decade earlier. The government claimed that targets were missed because of the impact of the COVID-19 pandemic, and whilst this was undoubtedly a factor, it hides the long-term inability or unwillingness of the responsible ministers to proactively enact its own plans.

3. Waste Management in Northern Ireland

The recycling rate in Northern Ireland was the lowest in the UK in 2009/10 at 35.2%. As a response, the (then) Northern Ireland Environment Minister (Alex Attwood) proposed a "bold new plan" to prevent waste being disposed via landfill by using planned interventions that focus only on areas where most impact could be achieved. Consequently, the national waste strategy for Northern Ireland, *Delivering Resource Efficiency*, published in 2013 set out a policy framework for sustainable management of waste. It ambitiously proposed to introduce a 60% recycling target by 2020 for LA collected municipal waste; this ultimately defaulted to the EU's 50% target. The strategy emphasised the need to view waste as a resource, with landfill diversion recognised as the key driver and contained specific targets for municipal solid waste management by 2015 and 2020. Recycling targets for specific waste streams were in line with those of the EU Directive on Packaging and Packaging Waste (94/92/EC). In September 2014, the Northern Ireland Executive released its National Waste Prevention Programme for Northern Ireland—the Road to Zero Waste, which outlined a strategy to reduce waste arisings, improve resource efficiency and emphasised the need for a whole life cycle approach in evaluating resource management solutions.

Northern Ireland first met its recycling rate target in 2018/19, although it fell back to 50% in 2020/21 from a high point of 51.1% in 2019/20.

4. Waste Management in Scotland

The recycling rate in Scotland was 36.7% in 2009/10. *Scotland's Zero Waste Plan*, published in June 2010, provided Scotland's overarching, long-term policy document for resource efficiency and sustainable waste management. The document outlined the Scottish Government's long-term vision for a "zero waste" Scotland. Measures promoted in the document included a ban on landfilling of certain recyclable materials, a requirement for local authorities to separately collect certain wastes (e.g., food waste) restrictions on thermal treatment feedstock and the establishment of a 25% cap on local authority collected waste (LACW) sent for thermal treatment and measures to reduce GHG emissions from waste management. The document sets a series of targets for recycling, preparation for reuse, or composting (or AD) of LACW and a target for a maximum landfill rate of 5% of LACW by 2025. These policies and targets were legally established by the Waste (Scotland) Regulations (2012). The Scottish Government followed this up by publishing the Scottish Household Recycling Charter in 2015 that set out a more consistent approach to household recycling collection systems. The charter was supported by a Code of Practice, also published in 2015, that aimed to increase householder participation in recycling, improve the quality

of recyclate; and provide greater economic benefits and opportunities for savings in local authorities. Further actions included assistance from the Scottish Materials Brokerage Service to develop contracts to reduce risk from price volatility of recyclables and a statutory Code of Practice for Materials Recovery Facilities.

Scotland's recycling rate peaked at 45.5% in 2016 but has since dropped slowly, partially because of the pandemic and partially because of falls in paper and cardboard recycling. Despite its plans and measures, Scotland failed to meet its EU target to recycle 50% of household waste by 2020, achieving only 44%.

5. Waste Management in Wales

The recycling rate in Wales was just 7% in 2000/01, reaching 40.5% in 2009/10 as a direct response to the Landfill Directive (Council Directive 1999/31/EC). The Welsh Assembly Government (WAG) decided to politically prioritise and encourage participation in household recycling. It published its ambitious long-term waste strategy, entitled *Towards Zero Waste* in 2010. It set out a framework for improving resource efficiency and the sustainability of waste management in Wales until 2050. Measures promoted include waste prevention (a target of an annual 1.5% reduction in national waste arisings until 2050 is set), separate collection of food waste, the provision of information on the destinations of recyclate, kerbside sort for household dry recyclables collection (this measure is currently under review). The document set a series of targets for recycling, preparation for reuse, or composting (or AD) of LACW and stipulated that, at a minimum, 80% of waste sent for recycling, preparation for reuse, or composting (or AD) must come from source separation. Further targets included maximum levels of landfill of municipal waste, 10% in 2019/20 and 5% in 2024/25, and maximum levels of thermal treatment of MSW for individual local authorities. These policy measures and targets were legally established by the Waste (Wales) Measure 2010. Implementation of the strategy was anticipated via six key Sector Plans that described the role of each sector in delivering the outcomes, targets, and policies in *Towards Zero Waste*.

In December 2013, the WAG introduced the *Waste Prevention Programme for Wales*, which addressed waste prevention in fulfilment of the requirements of the EU Waste Framework Directive. The strategy supported *Towards Zero Waste* and outlined policies and targets to encourage waste prevention action from households, businesses, and the public sector. The WAG also established a broad and ambitious cross-sectoral sustainable development scheme, which is outlined in *One Wales: One Planet*, published in May 2009 ^[9]. After years of consultation, the bold policies outlined in *One Wales: One Planet* were legally established through the Well-being of Future Generations (Wales) Act 2015.

The WAG has successfully delivered its plans. Welsh councils first recycled, reused, or composted its target of >50% of municipal waste in the twelve months to December 2012 (52%). Wales's recycling rate has steadily continued to increase, recently rising from 65.1% in 2019/20 to 65.4% in 2020/21, a record high. Wales undoubtedly had tougher COVID-19 restrictions in place than England, and total municipal waste arisings dropped by 2.6% in the last year, making this achievement even more impressive.

So why has Wales been so much more successful in managing its waste than its UK contemporaries? The historical trends in recycling in Wales and the reasons for any changes to see if the WAG's distinctive approach has been successful should be taken into account.

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