



Enough is enough:

The case for a moratorium on incineration

Study

September 2023

Equanimator Ltd for Zero Waste Europe

zerowasteurope.eu

Executive Summary

Key Observations

Within the EU, in 2020 (the latest year for which data were available from Eurostat), treatment capacity at waste incinerators classified as 'D10' (disposal) and facilities incinerating municipal waste and co-incinerating waste (R1) was:

- 183.5 million tonnes at R1 facilities;
- 15.3 million tonnes at D10 facilities; and
- 198.8 million tonnes at R1 and D10 facilities combined.

The historic trend in capacity evolution in the EU has been for 8 million tonnes of capacity to be added annually over the period 2004-2020. On that basis, capacity may now, in the latter half of 2023, have reached around 220 million tonnes (although the COVID-19 pandemic may have slowed the pace of construction of new facilities).

Waste statistics taken from Eurostat indicate that in 2020, the combined quantity of waste actually treated through R1 and D10 was 10.5 million tonnes of hazardous waste and 128.2 million tonnes of non-hazardous waste.

These figures suggest that there was already capacity to treat 60 million tonnes or so of **additional** waste through existing D10 and R1 installations in 2020. There may, of course, be a mismatch between categories of waste available for treatment, and the nature of the installations where capacity is not fully utilised.

Over 90% of non-hazardous wastes dealt with via D10 and R1 are reported to come from seven waste categories, with four categories accounting for more than 80% of the wastes managed at such installations. Three of these are, to those familiar with EU waste statistics, the key mixed/leftover waste categories, household and similar wastes, sorting residues and mixed and undifferentiated materials.

Eurostat statistics on municipal waste (MSW) tell us that the vast majority of waste that is incinerated is sent to facilities that achieve the R1 threshold criterion. We noted in a previous report how this has progressively become a meaningless threshold (it is met by virtually any 'legislatively compliant' incinerator).¹

¹ D. Hogg (2023) Debunking Efficient Recovery: The Performance of EU Incineration Facilities, Report for Zero Waste Europe, January 2023.

Table E-1: Key Non-hazardous Waste Categories Dealt with at D10 and R1 Facilities

	D10+R1	
Household and similar wastes	49,310,000	38%
Sorting residues	31,210,000	24%
Wood wastes	19,790,000	15%
Mixed and undifferentiated materials	7,210,000	6%
Animal and mixed food waste	5,160,000	4%
Common sludges	3,390,000	3%
Plastic wastes	2,680,000	2%
Industrial effluent sludges	1,800,000	1%

The quantity of MSW dealt with through R1 and D10 facilities (at 62 million tonnes) is 19 million tonnes lower than the amount of waste dealt with at incinerators being reported by CEWEP. The gap between the CEWEP figure and the MSW treatment figures ought to indicate non-municipal waste which is non-hazardous and treated at incineration. Our understanding (based on the Manual on Waste Statistics) is that this would not qualify as R1 and should be classified as D10, yet the difference between these figures far exceeds the amount of non-hazardous waste reportedly treated as D10 disposal.

If all the common material categories which are being dealt with by incinerators, and which are currently landfilled, were sent to incinerators, the quantity needing to be dealt with by D10 and R1 would increase by 76 million tonnes. **In that unlikely scenario, and with recycling and waste generation remaining at 2020 levels, then the shortfall in D10 and R1 capacity combined would be 15.8 million tonnes.**

It is clear, though, that EU policy and law seeks to reduce the amount of waste generated and increase the proportion of the waste which remains that is recycled. **If the EU meets its recycling targets**, then a further 36.4 million tonnes, equivalent to just under half of all the non-hazardous waste that was landfilled in 2020, would need to be recycled. This alone would move D10 and R1 capacity back into **a surplus of around 20.6 million tonnes, even when assuming all suitable wastes were being made available for R1 and D10 (and none were landfilled).**

Even countries with landfill bans or restrictions in place landfill some MSW (for all Member States, the figure is non-zero (recalling also that landfilling of incinerator residues is not counted as landfilling of MSW)). Some landfill very little such waste, others, a greater share, depending on the nature of the ban (and the reporting²).

² For Germany, for example, the figure has been estimated by Eurostat for every year since 2013.

The Landfill Directive allows landfilling of 10% of MSW, so that this practice is likely to continue at some level for fractions of municipal waste, as well as some other non-hazardous wastes which might otherwise be considered suitable for landfill. **If one considers the 10% figure to apply, other than in member States where MSW landfilled is already below 10%**, this would suggest that 15 million tonnes of waste might continue to be landfilled in future. **The surplus – even with all suitable wastes available for D10 and R1 moves up to 35.6 million tonnes.**

Either in their quest to meet recycling targets, or in their attempt to reduce the contribution of incineration to climate change, or for both reasons as we have indicated elsewhere, there is an **opportunity to deploy Leftover Mixed Waste Sorting (LMWS) to waste leftover after separate collection**. Because there is a rationale for focusing on (and a relative emphasis on) extracting plastics for recycling, the effect is to reduce the calorific value of the remaining waste. In principle, existing incinerators' capacity to deal with waste could be increased as a result of the associated drop in calorific value (since such facilities are generally limited in their capacity by the overall calorific content of waste being treated).

There are around 92 million tonnes of two categories – Household and similar wastes and Mixed and undifferentiated materials – currently either treated at D10 and R1 facilities or landfilled. In addition, there are 66 million tonnes of 'sorting residues'. If we consider that all household and similar wastes, mixed undifferentiated materials, and about 30 million tonnes of waste going to facilities (currently) for turning into refuse derived fuel / solid recovered fuel, could undergo LMWS, but that we subtract the additional amount requiring to be recycled, then we have just over 80 million tonnes would be eligible for such treatment.³ Thanks to the lower net calorific value (NCV) of the resulting output, this would be capable of being managed at facilities currently managing around 56 million tonnes of waste, freeing up an additional 24 million tonnes of capacity. **The surplus relative to current R1 and D10 capacity would (combined with the above**

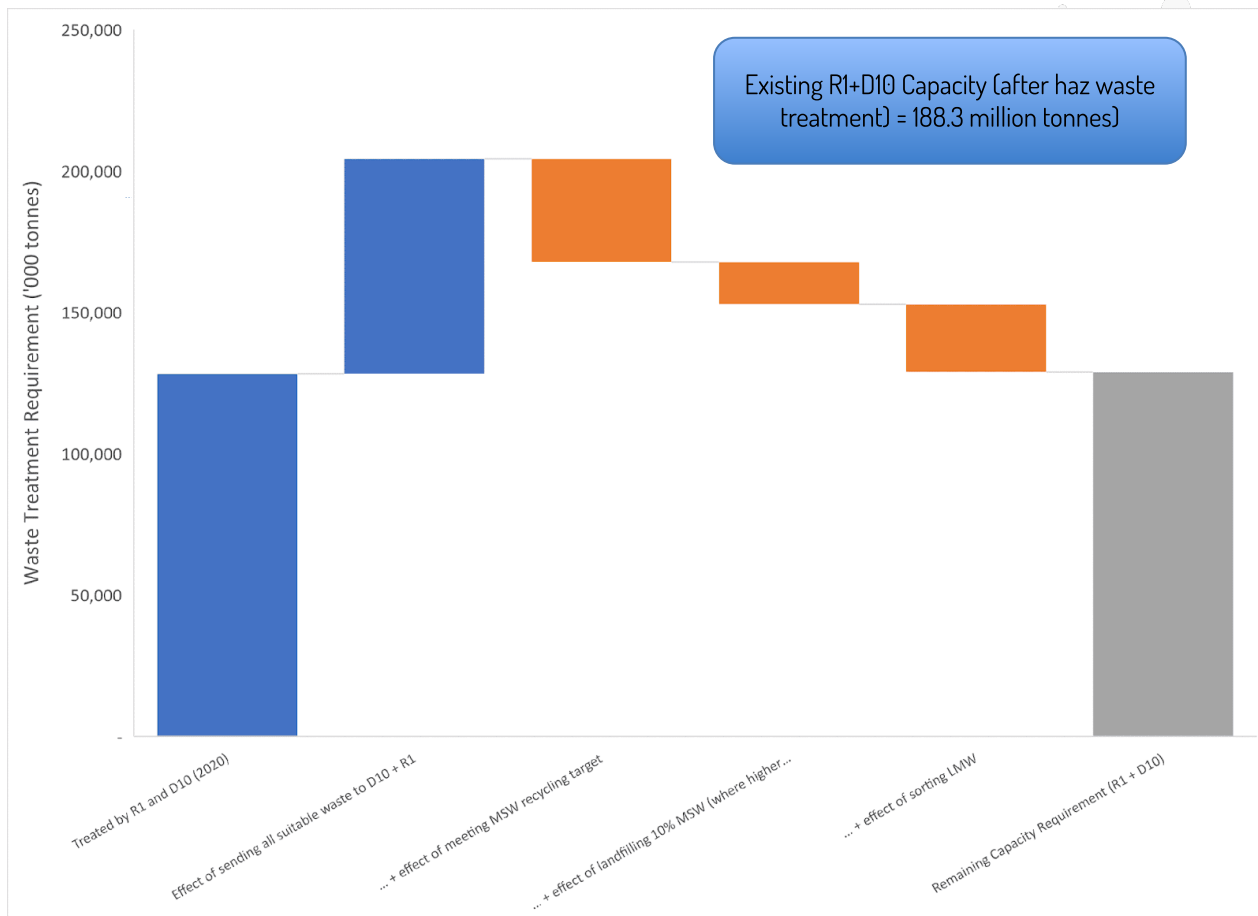
³ As of early 2017, ecoprog estimated that in Europe, there were 'around 570 active MBT plants with a treatment capacity of 55 million tons' (up from 490 with a capacity of 47 million tonnes in 2015). ecoprog expected a further 120 facilities with an estimated capacity of almost 10 million annual tons to be commissioned between 2017 and 2025 (see <https://ecoprog.com/publications/report-market-for-mbt-plants-in-europe-2017> and Mark Döing (2016) The Market for Mechanical Biological Waste Treatment Plants in Europe, Waste Management, Volume 6, September 2016). Capacity for MBT in Germany was estimated as 3.9 million tonnes in 2022, with throughput of the order 3.2 million tonnes (ASA (2022) Gewährleistung der Entsorgungssicherheit durch mechanisch-biologische Abfallbehandlungsanlagen: Arbeitsgemeinschaft stoffspezifische Abfallbehandlung e. V., 23 June 2022, www.asa-ev.de/fileadmin/Media/ASA-EV/Downloads/PDF/ASA_e_V_Notfallplan_Gas_-_Gewaeehrleistung_der_Entsorgungssicherheit_durch_stoffspezifische_Abfallbehandlung_final.pdf). In 2020 in Italy, 18.5 million tonnes of authorised capacity for MBT accounted for treatment of 9.5 million tonnes of urban residual waste, mainly leftover mixed wastes (ISPRA (2021) Rapporto Rifiuti Urbani, Edizione 2021, Rapporti 355/2021, December 2021). In Spain, some 11.8 million tonnes of residual MSW were treated either through aerobic or anaerobic treatment, with a further 1.6 million tonnes treated at sorting plants prior to thermal treatment (MITECO (2020) Memoria Anual de Generación y Gestión de Residuos: Residuos de Competencia Municipal. 2019, www.miteco.gob.es/es/calidad-y-evaluacion-ambiental/publicaciones/memoriaanual2019generacionygestionresiduosrescompetenciamunicipal_tcm30-534462.pdf).

Our figure of 30 million tonnes is an estimate of the current quantity treated through such facilities in the EU as a whole (Germany, Italy and Spain together account for 26.1 million tonnes). Whilst these facilities may remove some plastics, alongside some metals, they have not always been specifically configured with high quality sorting systems for removal of a range of plastics, with plastics mainly valued for calorific value rather than for the embodied carbon and energy savings.

measures) increase to around 60 million tonnes, or much the same level of surplus as exists on paper today. This is somewhat remarkable in that it suggests that even if we were to channel all wastes 'broadly suitable' for management via R1 and D10, then if recycling targets are met, and if LMWS systems are widely deployed, roughly the same quantity of non-hazardous waste would remain to be managed via R1 and D10 as is being managed today.

These effects are shown, stepwise, in the Figure below. This highlights the fact that **even if all wastes suitable for D10 and R1 incineration / co-incineration were effectively sent to such facilities, then with targets for MSW being respected, and with some additional sorting of leftover mixed waste, combined R1 and D10 capacity would be much as it is today: the significant surplus of R1 and D10 capacity of 60 million tonnes or so would remain.** This figure falls to 50 million tonnes if we assume that MSW grows at historic rates between 2020 and 2035.

Figure E-1: Effects on Required R1 and D10 Capacity of Key Assumptions and Changes



We also examined the situation with specific reference to municipal waste. The heterogeneous nature of leftover mixed municipal waste is such that where it is not further sorted / treated, then incinerators receiving the waste tend to be designed specifically for this purpose. Some MSW is sorted so that a more-or-less-well prepared fuel is made available, but much of the reported 62 million tonnes sent to R1 facilities will be sent to dedicated incinerators, with CEWEP indicating a total capacity of incineration facilities of the order 81 million tonnes. In the absence of waste growth, then **simply meeting the 65% MSW recycling target leads to a situation where, if Member States currently landfilling more than 10% of MSW landfill no more than 10%, and with the amount sent to R1 installations remaining as in 2021, there is no requirement for additional non-landfill treatment capacity at the EU-27 level.**

There are Member States, however, for which existing incineration capacity is effectively (further) freed up, and ones for which additional non-landfill capacity is required. The quantities of additional non-landfill treatment required depend upon the recycling rates achieved, and how leftover mixed waste (after separate collection) is treated. The 10% landfill quota can also be 'expanded' somewhat through use of biological

stabilisation (reducing the mass of the waste landfilled, and its propensity to generate methane, and aligning with the spirit of the poorly articulated requirements in the Landfill Directive to pre-treat waste prior to landfilling).

Waste of the type we are discussing already crosses borders, and that movement is facilitated in part by the R1 criterion allowing for the trans-frontier movement of wastes. We have argued elsewhere that the R1 designation is unwarranted, and in any case, has been rendered irrelevant by the progressive watering down of a criterion which evolved out of considerations of what is best available technology. In other words, the criterion was initially intended to represent what facilities needed to do in order to be permitted at all.⁴

Recommendations

If the emerging issue of over-capacity were already acknowledged, then given the average life of facilities, somewhere around 5% of capacity might be being decommissioned / retired each year. The observed trend is very different.

Member States, when considering their own capacity needs, take different views regarding the desirability, or otherwise, of importing waste from other countries for incineration. There are pros and cons to both approaches, one of the cons being that territorial greenhouse gas emissions associated with incineration increase as a result, one of the pros being that a service of waste management is effectively exported to other countries (even as the waste is imported).

The capacity for managing leftover mixed waste is an issue, though, which would benefit from EU-wide coordination. If Member States that could otherwise offer freed-up capacity to others were considering compensating operators for an early decommissioning, then if that leads to new facility development elsewhere, the net effect is unlikely to be positive, especially if this takes place in the context of EU capacity continuing to increase, and taking into account the carbon embodied in the construction of new facilities, and the potential for lock-in effects, especially where facilities are configured to supply heat.

There would appear to be a strong argument for EU level coordination in this matter. Operating companies might not be able to discuss this openly for fear of accusations of collusion. There may, though, be a rationale for Member States to consider treatment capacity as a matter that is not confined purely to their own territorial borders (waste is, after all, already moving across frontiers within the EU). Any planned decommissioning would benefit from being carefully coordinated. Those Member States where excess capacity already exists should consider imposing moratoria, and potentially, managing a reduction in capacity. Factors that might come into play in that retreat would be the age of facilities, their role in a spatially coherent network, the ease with which they might access carbon capture and storage facilities and (this applies only to facilities already doing so) whether facilities are connected to district heat networks.

⁴ D. Hogg (2023) Debunking Efficient Recovery: The Performance of EU Incineration Facilities, Report for Zero Waste Europe, January 2023.

In Member States which might otherwise be pushed to consider additional D10 or R1 capacity within their borders, it would seem exactly the right time (before more capacity is constructed because that is what EU policy and law may appear to require) to indicate the equivalence of landfilling and incineration, as long as the wastes received are both already subject to LMWS, and as long as waste being landfilled is stabilised to achieve a minimum stability criterion.⁵ Eliminating the landfilling of untreated (or not-biologically-stable) waste, and placing incineration and landfill of suitably pre-treated waste on the same – lowest – tier of the waste hierarchy would likely give greater flexibility to Member States pursuing higher recycling rates, and allow more rapid progress towards climate mitigation in those where landfilling of LMW is still significant.

The flexibility of a strategy to scale down capacity for incineration is constrained by a commitment to the placing of incineration higher in the hierarchy than the landfilling of suitable treated residual waste that looks increasingly ideological. The decision-making process regarding decommissioning of facilities would be made that much easier if the limit of 10% of MSW landfilled, which loses its justification if the requirement to pre-treat waste prior to landfilling is sensibly enforced, was disapplied. What the EU needs, after all, is a continuing capacity – which diminishes over time – to manage LMW and the resulting residual waste in an environmentally responsible way (including sorting of LMW, as necessary). The 10% landfill limit artificially constrains choices as to how best to achieve this outcome.

Article 12 of the Waste Framework Directive noted:

2. By 31 December 2024, the Commission shall carry out an assessment of the disposal operations listed in Annex I, in particular in light of Article 13, and shall submit a report to the European Parliament and to the Council, accompanied, if appropriate, by a legislative proposal, with a view to regulating disposal operations, including through possible restrictions, and to consider a disposal reduction target, to ensure environmentally sound waste management.

It might be a sensible time to re-consider the role of incineration in the waste management hierarchy, choosing to classify it as a disposal operation. Furthermore, in future, incinerators should only accept leftover mixed wastes from municipal sources where they have been through advanced sorting facilities.

⁵ See Equanimator (2021) *Rethinking the EU Landfill Target*, Report for Zero Waste Europe, October 2021, zerowasteurope.eu/library/rethinking-the-eu-landfill-target; Dominic Hogg (2022) *The Case for Sorting Recyclables Prior to Landfill and Incineration*, Special Report prepared for Reloop, June 2022.



Authors: Dr Dominic Hogg, Director, Equanimator Ltd. (www.dominichogg.com)

Editors: Janek Vahk, Shlomo Downen, Enzo Favoino, Séan Flynn

Date: September 2023

General information: hello@zerowasteeurope.eu

Media: news@zerowasteeurope.eu

zerowasteeurope.eu

