



# Cap-and-trade on residuals

Proposals for a Circular Economy Act

Policy brief

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# Executive summary

If the EU is serious about advancing a circular economy, it should avoid policies that narrowly restrict landfilling in ways that risk simply promoting incineration. The priority must be to reduce residual waste (landfill, other disposal, incineration, co-incineration) by preventing waste generation in the first place and by making better use of materials. Instead of focusing on 'not landfilling', EU policy should target a progressive reduction in residual waste. This approach not only supports recycling but also drives prevention through reuse, repair, remanufacturing, reclamation, and eco-design. Restrictions targeting landfill only risk shifting waste to incineration, except for non-combustible streams.

We briefly considered taxes/levies before considering what a cap-and-trade system—proposed in the recent Circular Economy consultation for landfill—might look like. Any attempt to develop the latter should not focus solely on landfill, but on residual waste management as a whole. Because major mineral and combustion wastes account for more than 80% of landfilled waste and around two-thirds of all landfill and incineration, quantities vary greatly across Member States. Therefore, including them in a single scheme risks having the management of such waste types dominate a single scheme. A separate scheme—using landfill levies and harmonised rules under Article 24 of the Waste Framework Directive—may be more effective for major mineral and combustion wastes. Complementary measures, such as an EU-wide tax on extraction of primary aggregates and minerals, could also steer these flows towards higher-value use.

For municipal and non-mineral wastes of other origin, a cap-and-trade approach for residual waste management is worthy of exploration. Data quality is uneven, but improving, particularly for municipal waste, where EU targets already require reliable reporting, and where progressive harmonisation is needed. Hence, targeting municipal waste may be a sensible approach given the data reliability. If a scheme was to be based on active trading of allowances, the simplest choice regarding the point of regulation would be owners and operators of residual waste facilities (around 6,000 across the EU), as targeting households or upstream actors would be administratively awkward. This enables a suitable approach to monitoring and verification, though it might limit direct pressure on waste generators.

Allowance values under a given level of restriction on residual waste would be affected by other policies in place: bans, restrictions, or high taxes on landfill/incineration would reduce demand for allowances for 'residual waste management'. An EU-wide scheme that was based on active trading in a marketplace would, therefore, need mechanisms to be in place to account for differences in national policy regimes, and while free allocation might achieve this, such a system may still prove difficult to devise in such a way as to be 'fair'.

An alternative, which we believe is a promising option, would be forms of "passive trading" between Member States. Allowances from the overall cap would be distributed based on population, and revenue-neutral levies would be applied where residual waste per capita exceeds agreed benchmarks, with funds redistributed to better-performing states.

Such schemes depend on reliable data on residual waste flows, and further harmonisation of reporting is essential. They also involve revenue transfers between Member States—a politically sensitive feature—but this should be seen in the context of existing recycling obligations. If all Member States converge toward compliance, the net transfers would diminish while incentives for laggards would remain strong. Importantly, these approaches place responsibility on Member States to deliver waste reduction—addressing the persistent challenge of poor implementation in EU waste policy.

# Background

The concept of a circular economy is often contrasted with a linear economy, which is characterised by a 'take-make-dispose' approach to materials, products and packaging. A circular economy keeps materials in circulation and prevents 'leakage'—the loss of materials to end-of-pipe solutions, i.e., landfilling, incineration, co-incineration and other disposal.

The Public Consultation on the Circular Economy Act (CEA) included a question on '*measures to reduce the landfilling or incineration of waste and incentivising recycling*'. In addition to stronger enforcement of existing laws on landfilling and uncontrolled dumping, the consultation presented the following options:

- a. Strengthening the provisions on enforcement of EU legislation concerning landfilling and uncontrolled dumping of waste*
- b. Introducing a general ban on landfilling of waste*
- c. Introducing (additional) bans on landfilling for specific types of waste*
- d. Tax policy aimed at taxation of landfilling waste in the EU*
- e. Tax policy aimed at taxation of incinerating waste in the EU*
- f. Introducing a market-based instrument (e.g. cap-and-trade systems) for landfilling waste in the EU*
- g. Ensuring a level playing field for circular products by eliminating value added tax (VAT) embedded in the value of recycled goods used as input*

Of these, each of b., c., d. and f. would, if implemented on their own (and specifically, if implemented without e.), reduce landfilling of waste. The extent of this reduction, and the degree to which the measures contribute to a more circular economy, would depend both upon the design of the policies themselves, and crucially, on the presence and effectiveness of other supporting policies.

The UK offers relevant experience through its landfill allowances scheme for biodegradable municipal waste, introduced to implement the Landfill Directive. Within the UK, England—where trading of allowances was a feature shortly after implementation—provides insights as to what can happen using such a system. One of the key lessons relates to the interaction with landfill tax. After the landfill allowances scheme was introduced, the UK continued to increase the landfill tax rates. It can be shown that as landfill tax rises, the market price of tradable allowances under a given cap falls.<sup>1</sup> In the UK, successive tax increases effectively rendered the allowance scheme redundant. In the Impact Assessment of the phasing out of Landfill Allowance Trading Scheme (LATS), Defra - Department for Environment Food and Rural Affairs noted:<sup>2</sup>

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<sup>1</sup> As a basic thought experiment, consider that at extremely high rates of tax, those generating waste will have a strong incentive to do anything other than landfilling. The demand for allowances to landfill waste would then fall, so that their traded value falls (close) to zero. This had been highlighted when the scheme was first introduced - see D. Hogg and R. Salmons (1999) *Instruments to Implement the Proposed Landfill Directive BMSW Targets*, Final Report to DETR.

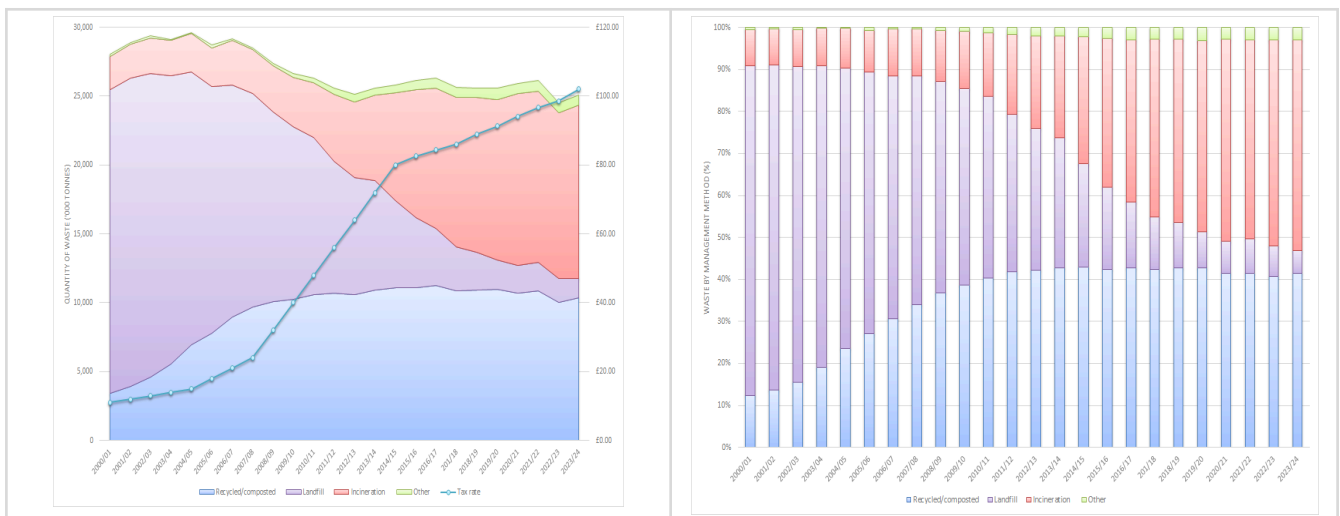
<sup>2</sup> Defra (2012) Landfill Allowance Trading Scheme: Impact Assessment, 1 April 2012.

the majority view (including the leading local authority and industry bodies NAWDO, ADEPT, CIWM and ESA) was that, although LATS [the Landfill Allowances Trading Scheme] had been a driver to kick start diversion of waste from landfill, it had now been superseded by the Landfill Tax. This is currently £56 per tonne (in 2011/12) rising to £80 per tonne by 2014/15 for active waste, and set at this floor until at least 2020. In contrast the level of tax was £9 and £12 a tonne in the years when LATS was introduced. Similar views were expressed at the stakeholder workshop in May 2010.

Subsequent years have demonstrated the validity of this view in England. In the period 2000 to 2010, including the early years of the LATS, once sanctions for non-compliance with LATS were established, the main driver for the decline in landfilling of waste controlled by local authorities was in the growth of recycling/composting (see Figure 1). At the time, there were statutory recycling targets in place for local authorities. Since 2010, following a change in government, statutory recycling targets have been removed while the landfill tax has continued to rise. The main shift in waste management since then has been from landfill to incineration, with recycling rates remaining static (Figure 1).

This suggests focusing solely on 'not landfilling' is insufficient to build a circular economy. Policies that risk simply diverting waste from landfill to incineration may ultimately be counter-productive.

**Figure 1: Management of local authority controlled wastes in England and evolution in landfill tax**



Source: Equanimator, based on data from Defra and HMRC

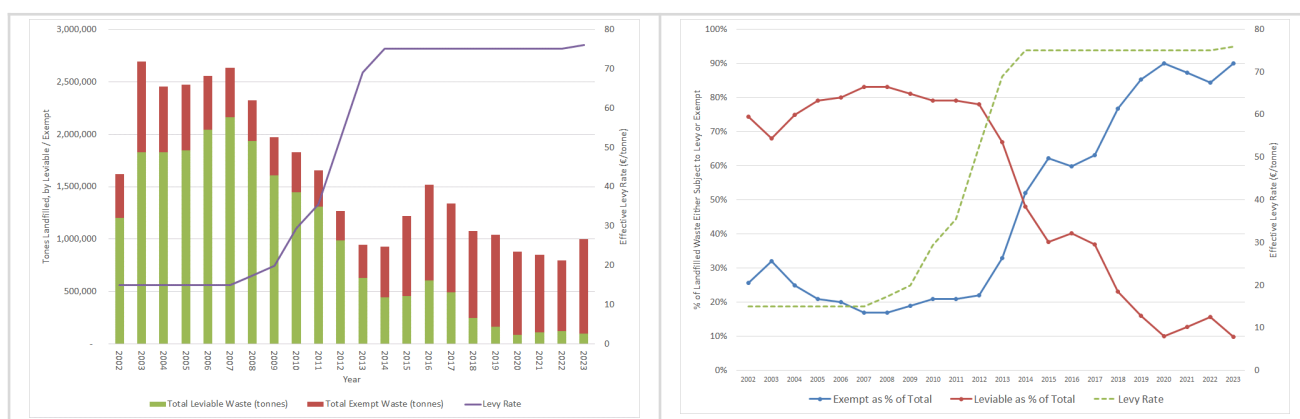
Similar points apply to countries that have introduced landfill bans or restrictions. Unless such measures are accompanied by ambitious complementary policies aligned with a circular economy, there is a risk that wastes will simply move from landfills to incinerators. A ban functions like an infinite landfill tax and, if enforced, produces similar effects to those observed for local authority waste in England (see above).

The scope of landfill taxes also matters. Many countries apply different tax rates to different waste streams, or exempt some types of wastes altogether. Where differential rates exist, as in the UK tax, large gaps can create incentives to misclassify waste. For example, in the UK, as the standard rate of tax (applied to, for example,

municipal-type waste) has risen from £7 per tonne in 1996 to £126.15 per tonne in 2015, the lower rate of tax (applied to qualifying inert-type wastes) has risen from £2 per tonne to £4.05 per tonne. The widening gap between the two tax rates—rising from £5 per tonne to more than £120 per tonne—has created an incentive to misdescribe wastes with a view to saving money. England and Wales recently consulted on gradually moving the lower rate of tax.

The same effect can be observed in countries where exemptions from tax are in place. The Republic of Ireland’s landfill levy provides an example of this, with the proportion of landfilled waste that was subject to the levy shifting significantly over time from ‘leviable’ to ‘levy exempt’ waste (see Figure 2). Some of this shift will undoubtedly reflect changes in management that the levy and exemptions were designed to encourage, but the €85 per tonne differential between exempt and leviable waste likely generates incentives for some behaviours that were not intended, including some misdescription of landfilled waste.

**Figure 2: Change in landfilled quantity, leviable and exempt, as reported for levy purposes (left hand side - absolute tonnage; right hand side - as % total landfilled)**



*Note: the levy rate as plotted in this figure is the average levy rate paid during the course of the year in question (so where the levy changes during the course of the year, the figure plotted will be the weighted average levy paid over the course of the year).*

Finally, although there are different classes of landfill as set out in the Landfill Directive, much of the waste typically described as more inert, and which can be landfilled at inert waste landfills, may, depending on Member State practices, find its way to recovery sites which may be exempted from permitting under Article 24 of the Waste Framework Directive. Where waste from construction and demolition are subject to levies, a focus on ‘not landfilling’ can push wastes into forms of ‘material recovery’ which are not considered ‘recycling’, some of which may be of questionable value, and where the facilities concerned may be subject to limited regulation. If such wastes are subject to levies or restrictions, then ensuring that there is adequate oversight of ‘material recovery’ options would be wise given the potential for wastes which might not be ‘inert’ to be buried at such sites.

# Managing residual waste to support a circular economy

An approach to stimulate a circular economy ought to have in mind the objective of minimising not only the waste sent to landfill, but also the waste sent to incineration (and co-incineration) and other forms of disposal. As indicated above, experience elsewhere indicates that focussing too narrowly on ‘not landfilling’ can lead to over-investment in incineration (and, to a lesser extent, co-incineration). Measures included in the Commission’s consultation seem to place too much emphasis on ‘*not landfilling*’.<sup>3</sup> If the intention is to foster a circular economy, the measures being considered would seek to reduce the quantity of waste being both landfilled and incinerated. With a view to reducing the effects of waste management on climate change, this would best be advanced in a situation where the interpretation of the Landfill Directive in existing case law was given substance so that no waste was allowed to be landfilled without treatment, this being understood to encompass further sorting (to separate recyclables) and biological stabilisation of the remaining wastes.<sup>4</sup>

Several jurisdictions have used targets on residual waste to drive improvement in waste management. For example:

- In its municipal waste management plan 1997-2001, OVAM, the public waste agency of Flanders, set targets for the generation of residual household waste to fall over time to 150kg/inhabitant (inh). Residual waste was defined as ‘waste not recycled/composted’.
- In Wallonia (Belgium), the regional government introduced a novel instrument in which the local authorities were subjected to a residual waste levy. Each municipality was allocated a quota (based on residual waste per inhabitant), which was free from the application of the levy. For those authorities whose generation of residual waste exceeded this ‘quota’, a levy on the amount above quota was applied. The quota was reduced over time to encourage local authorities to reduce residual waste. This had the effect, amongst other things, of encouraging widespread dissemination of pay-by-use charging.
- In the UK, the government was tracking the indicator of residual waste (excluding “major” mineral waste) per household. In 2023, it updated its Environment Plan and set interim targets for 2028. The plan commits the government to halving residual waste (excluding “major” mineral waste) produced per person by 2042. For the purposes of the target, the government says it defines “residual” waste as

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<sup>3</sup> See also Equanimator (2021) *Rethinking the EU Landfill Target*, Report for Zero Waste Europe, October 2021.

<sup>4</sup> European Commission v. Italian Republic. <http://curia.europa.eu/juris/liste.jsf?language=en&num=C-323/13>: “*by not taking all necessary measures to ensure that part of the municipal waste going to the landfills of the Rome SubATO, excluding the Cecchina landfill, and to those of the Latina SubATO undergoes treatment, including a proper sorting of the various fractions of the waste and the stabilisation of the organic fraction, has failed to fulfil its obligations under Article 1(1), in conjunction with Article 6(a), of Council Directive 1999/31/EC of 26 April 1999 on the landfill of waste, and Articles 4 and 13 of [the waste framework] Directive 2008/98/EC*”.

waste that is sent to landfill, put through incineration or used in energy recovery in the UK, or that is sent overseas to be used in energy recovery.

These targets recognise that measures to target a reduction in residual waste are likely to help support policies designed to support a more circular economy. A policy that switches waste from landfill to incineration can be counterproductive. It is especially likely to be so if Member State law *requires* treatment of waste prior to landfilling in line with the EUCJ ruling (see above).

## What wastes are being landfilled and incinerated?

The Eurostat description (under the 'Reference metadata') for the indicator 'Generation of waste excluding major mineral wastes per GDP unit' includes the following:

*Major mineral wastes are excluded because weight of total waste generation and treatment is mainly driven by mineral waste from construction/demolition and from mining activities, and the latter widely varies in importance across Member States. Excluding major mineral wastes reflects more accurately general trends than the total waste and improves comparability across countries.*

One of the first matters that policy needs to consider is how it will apply to which waste streams if the intention is to be fair across countries. In a cap-and-trade scheme, for example, if major mineral wastes were included, then the design of the scheme would need to consider the above point, not least so as to avoid a situation where some Member States' economies are disproportionately affected, and managing the major mineral wastes 'dominates' in the scheme.

Glancing at Table 1, which highlights the quantity of waste sent to selected disposal/recovery options, the vast majority of waste sent to landfill, by tonnage, is 'major mineral waste, covering the following categories:

- Mineral waste from construction and demolition (EWC-Stat 12.1)
- Other mineral wastes (12.2,12.3, 12.5)
- Soils (12.6)
- Dredging spoils (12.7).

By contrast, of waste sent to R1 and D10 incineration, less than 2% is 'major mineral wastes'.

In general, the management approaches for the vast majority of wastes from construction, demolition and excavation, and from mining and quarrying, as well as their costs per tonne, are quite different from those of the municipal type wastes that account for around two-thirds of all the waste (excluding major mineral waste) sent to landfill or incineration.

If, taking Eurostat's points regarding major mineral wastes into account, one considers waste excluding major mineral wastes, then in 2020, the quantity sent to landfill was lower than what was sent to incineration, with the position being reversed in 2022. The quantitative increase, for landfilling between 2020 and 2022, was due almost entirely to an increase in landfilling of wastes from combustion (perhaps indicating the effects of the Ukraine war on energy supply). For incineration, there was a smaller fall in quantity, with this being distributed across streams.

**Table 1: Waste sent to relevant disposal/recovery options, 2020 and 2022, EU-27 (tonnes)**

	2020			2022		
	Landfill	Incineration	Backfilling	Landfill	Incineration	Backfilling
<b>All waste</b>						
Total hazardous and non-hazardous waste	613,870,000	138,620,000	268,330,000	591,390,000	135,900,000	283,440,000
Excluding major mineral wastes	122,280,000	136,180,000	16,700,000	136,900,000	133,670,000	17,260,000
<b>Non-hazardous waste</b>						
Total non-hazardous waste	598,050,000	128,180,000	265,670,000	550,610,000	125,450,000	280,650,000
Excluding major mineral wastes	116,530,000	126,570,000	14,140,000	130,620,000	124,070,000	14,720,000
<b>Hazardous waste</b>						
Total hazardous waste	15,820,000	10,440,000	2,660,000	40,780,000	10,450,000	2,790,000
Excluding major mineral wastes	5,750,000	9,610,000	2,560,000	6,280,000	9,600,000	2,540,000

Source: Eurostat

Note that, irrespective of the fact that there are wide disparities in generation across countries, the major mineral wastes are not major feedstocks for incinerators. Measures to target landfilling of these materials seem less likely to push wastes towards incineration, but rather, they may (as noted above) be moved into recovery routes that might be of limited value, and for which they might not always be (without additional treatment) appropriate. It would seem crucial to have in place measures designed to harmonise approaches to what may be legitimately backfilled, and what has to be sent to landfill.

# Policy options

There are (at least) three front-running approaches that could be taken to reduce the amount of waste sent to landfill and incineration:

1. Establish targets to reduce waste and increase recycling (so as to minimise the remaining waste to be sent to landfill or incineration);
2. Implementing taxes (or other forms of levy) on landfill and incineration, with the aim of reducing both;
3. Using a system such as a cap-and-trade system, as envisaged under '*Policy f*' in the Commission's consultation for landfill, but applied to both the landfilling and incineration of waste.

We do not consider the first of these further. We only note, in passing, that without such 'positive' measures in place (either at Member State or EU level), then the outcome, in terms of how waste is managed, will be heavily determined by the regulations and incentives that prevail at the base of the waste hierarchy.

## Taxes and levies

As regards the second option—taxes and levies—most EU Member States apply taxes to landfill. A smaller number also applies taxes to incineration. The taxes are applied at varying rates. These are not the sole determinants of the net costs of landfilling or incineration in a given Member State. Aside from their resource costs and the capital costs facing owners/operators, other factors come into play. Incinerators in particular are affected by the prevailing policy regarding energy, and whether or not one or other form of energy supplied is supported, either directly/explicitly (direct support for energy from incineration), or indirectly/implicitly (where incinerators are exempted from paying levies which ought to apply to them). Particularly in countries with low or no incineration taxes, the omission of most incineration from the EU-ETS might be considered an example of an implicit subsidy. Where landfilling is concerned, if Member States require treatment prior to landfilling, then the implied cost of managing a tonne of residual waste, some of which may be landfilled, will be higher than where no treatment is required.

In principle, the first-best solution for addressing environmental externalities would be one or more Pigouvian taxes<sup>5</sup>. Such a tax would be set at the rate where the marginal private benefit (MPB) and the marginal social cost (MSC) of additional units of pollution are equal. In practice, the exact form of the MPB and MSC curves is not always well known, and their assessment may change over time. Furthermore, the first-best approach is to tax the pollutant directly. Whilst some incineration taxes have sought to link the applicable rate to the emissions of carbon dioxide, despite their proliferation and the fact that a key environmental impact relates to

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<sup>5</sup> i: a fee levied on activities that create negative externalities, which are costs borne by third parties not involved in the transaction. The purpose of the tax is to internalize these external costs by making the responsible parties pay for the damage they cause, thereby correcting inefficient market outcomes and encouraging more socially optimal behavior. Examples include carbon taxes to address pollution, taxes on sugary drinks or tobacco to offset public health costs, and taxes on plastic bags to reduce waste.

methane emissions, there are no landfill taxes that are based on directly measured emissions of methane. Despite improvements in technology for detecting methane emissions, directly measuring emissions from landfills remains challenging, given the diffuse nature of emissions. Were measurement deemed feasible, one can see why this would be a first-best approach. **Setting taxes on the basis of a tonne of waste landfilled offers no incentive for improvement in performance as regards emissions, whereas a tax based on emissions would incentivise emissions reduction over the life of the landfill.** Nonetheless, if the EUCJ case law was given substance in all Member States, the potential for landfilled waste to generate methane would be minimised prior to it being consigned to the landfill (this does not, of course, address the methane emissions from waste that has already been landfilled without treatment to biologically stabilise the waste).<sup>6</sup> In principle, it ought to be possible to tax a range of emissions from incineration directly (for example, emissions of NO<sub>x</sub>), so that something closer to a 'first-best' approach could be implemented; though, with some notable exceptions, it has not been.

Taxes have the drawback in that they usually give rise to impacts that are uncertain, so taxes are adjusted to meet specific objectives. If the aim is to reduce residual waste sent to landfill and incineration, then the level of the taxes on each will influence the magnitude of the effect, but the extent to which there is a move, proportionately, towards landfill or incineration will be influenced by the level of each tax, and the resultant impact on the overall costs, inclusive of tax, of landfill and incineration. Into this mix, it should be appreciated that, as well as the taxes already in place, a) many countries already apply bans/restrictions on landfilling (beyond those which are explicitly stated under the Landfill Directive), and b) the inclusion of incineration within the EU-ETS seems likely to happen in the near future. If a tax-based system for landfill and incineration were to be introduced, it might make sense to abandon plans to move incineration into the EU-ETS, especially if the tax is linked, in part, to measured emissions of CO<sub>2</sub>.

## A cap-and-trade system

If what is being sought is a specific level of reduction in residual waste sent to both landfill and incineration, then it is more appropriate to use policies that target specific levels of residual waste reduction. Where the costs of reducing pollution vary across actors, then it makes sense to deploy market-based approaches, such as allowance trading (cap-and-trade) schemes, to enable a targeted level of reduction in residual waste to be delivered in an efficient manner.

An EU-wide measure might have a range of objectives:

1. To give further impetus to the mixed record of implementation of existing EU policy and law;
2. To give additional impetus (over and above existing law) to a circular economy;
3. To reduce emissions associated with residual waste management.

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<sup>6</sup> Ibid.

In what follows, we consider the potential for a cap-and-trade scheme for residual waste in the EU-27. The discussion is preliminary, and details would need to be further fleshed out, so the proposal is designed to provoke discussion and further thinking. To simplify the discussion:

1. we consider landfill and incineration, including co-incineration, as residual waste management methods (RWMs);
2. we consider all methods of (additional) waste prevention, reuse, recycling, composting (including anaerobic digestion), and legitimate recovery options to be forms of RWM reduction;
3. we abstract from some details regarding the above (for example, netting off of metals recovered for recycling from incineration, or the need to account for losses to RWM from recycling and other recovery activities).

## Scope (wastes)

The discussion around and the data within Table 1 are relevant here. We noted how the major mineral wastes face different cost curves currently, and that the associated costs of RWM reduction are very different. Table 2 shows the number of facilities of different types in the EU-27 as of 2022. There were more than 3,500 inert landfills believed to be in place in the EU-27 in 2022, as well as 7,070 backfilling operations. The costs of sending major mineral wastes to such sites will generally be lower than is the case for landfills engineered safely to receive non-hazardous waste, which is not inert in character. That is not to say that some major mineral wastes will not be received at landfills designed to receive non-hazardous waste: such wastes include materials that may be used in engineering landfill sites, including access roads, construction of landfill cells and use as daily cover. Indeed, to the extent that materials may otherwise have to be purchased from other sources, it is not unheard of for facilities to charge a very low gate fee (even negative fees) to attract such materials on-site. The local availability of such materials is affected by policy, including tax rates.

**Table 2: Number of recovery and disposal facilities in 2022, EU-27**

	European Union - 27
<b>Landfill for hazardous waste</b>	300
<b>Landfill for non-hazardous waste</b>	2,342
<b>Landfill for inert waste</b>	3,504
<b>Incineration (D10)</b>	550
<b>Incineration (R1)</b>	2,729
<b>Backfilling operations</b>	7,070

Source: Eurostat

Compare this with the costs of landfilling or incineration of non-hazardous wastes. In some Member States, the costs of sending residual waste to landfill remain low as existing law allows landfilling of waste without it being treated in line with the EUCJ decision. Were that law to be given substance, however, then the costs of

landfilling (inclusive of treatment) would potentially be of the order €100–€140 per tonne.<sup>7</sup> That is similar to gate fees for incineration in many countries, though such gate fees can be lowered were, for example, incineration benefits from explicit/implicit subsidies for energy exported.

Those Member States with no meaningful treatment requirement and low taxes on landfill will be the ones where landfilling would likely be reduced as a result of a sensible application of the EUCJ ruling. Doing so will increase the costs of managing residual waste, incentivising further recycling where this is not already required by a policy that is meaningfully enforced (and it is not a coincidence that Member States with low landfill costs tend not to have such policies in place). It follows that enforcing the interpretation of the EUCJ ought to be a key component of any policy to minimise residual waste.

The key question that remains, however, is whether it would make sense to include, within a cap-and-trade scheme (whether for landfill only, or for RWMs, as discussed here), major mineral wastes. Table 1 showed how 445 and 492 thousand of the 592 and 614 thousand tonnes of waste landfilled (77% and 80%) were major mineral wastes in 2022 and 2020, respectively. Including such wastes risks inviting a scheme to be dominated by the relative costs of RWM reduction for such wastes. In other words, until such time as the cap implies massive reductions in landfilling, wastes other than the major mineral wastes might not be strongly affected if the incremental costs of reducing RWM of major mineral wastes are low relative to the incremental costs of reducing RWM of the other waste types, which we believe to be the case.

From this perspective, it may make sense to have a separate cap-and-trade scheme for major mineral (and some other—see below) wastes, or to adopt a tax-based policy. Harmonisation should be sought in the approach to backfilling, and more generally, the approaches used to exempt activities from permitting as per Article 24 of the Waste Framework Directive. Without doing so, there is a risk that such wastes in scope will be managed inappropriately.

Separately from such wastes, a cap-and-trade scheme for reducing RWM could be considered for wastes of the following scope:

- Household waste;
- A specified 'range' of wastes;
- All wastes sent to incineration and to all hazardous and non-hazardous landfills;
- Municipal waste;
- All wastes other than major mineral wastes (and others, such as combustion wastes).

We consider the last two of these below.

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<sup>7</sup> See Dominic Hogg and Dinkar Suri (2023) *Nothing left behind: Modelling MRBT to maximise recovery of resources and minimise contributions to climate change*, Report for Zero Waste Europe, April 2023.

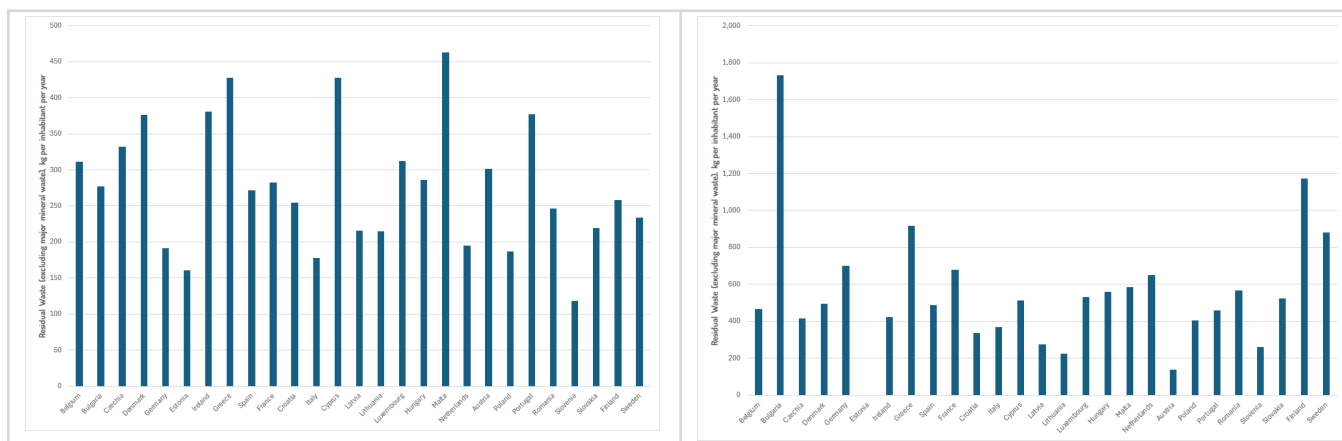
# Nature of the cap

2023 data indicates that for the EU-27, RWM for municipal waste was 244kg/inh. In the same year (or the latest year for which data were available), 17 Member States had RMW for municipal solid waste (MSW) above the EU average (3 exceeding by less than 30kg/inh), and 10 were below the average (see Figure 3, left-hand side). The Member States with the highest quantities per inhabitant are not necessarily those with the lowest (current) recycling rates because such Member States might be generating a smaller quantity (per inhabitant) of municipal waste. Given the need to report on municipal waste recycling already, a cap could be considered in terms of residual municipal waste per capita.

For waste, excluding major mineral wastes, figures for the EU-27 for various years are shown in Table 3. For the year 2020 (earlier years for some countries), the data for Member States were as shown in Figure 3 (right-hand side). These show considerable variation, with some outliers. These outliers could, potentially, be relatively easily dealt with: for Bulgaria and Greece, for example, the figures are affected significantly by the amount of combustion waste landfilled (it would, in our view, be more appropriate to include these alongside the major mineral wastes), whilst in Finland and Sweden, incineration of wood wastes affects the figures significantly.

Nonetheless, there appear to be other reasons to question the reliability of the data reported to Eurostat. For example, in the case of Austria, RWM for all waste excluding mineral waste is a lower number (less than half) than that for RMW for municipal waste. The differential between the two figures (municipal waste and all waste other than major mineral waste) exhibits enormous variation across the Member States. Given this wide variation (likely, reflecting the specific industrial structures and power mix in different Member States), the longer history of data collection for MSW, and the need to harmonise data on MSW for other purposes, it might be more appropriate to consider, as the basis for cap setting, residual MSW per capita.

**Figure 3: Residual Waste (kg per inhabitant per year): left-hand-side = municipal waste, 2023; right-hand-side = waste, excluding major mineral waste**



Source: Eurostat

**Table 3: Residual Waste (kg per inhabitant per year), for Waste, Excluding Major Mineral Waste**

Year	Landfill Disposal (D1, D5, D12)	Incineration (D10, R1)	Other Disposal (D2-4, D6-7)	Total
2010	392	264	9	665
2012	400	281	9	690
2014	389	291	7	687
2016	341	302	8	651
2018	355	311	7	673
2020	273	298	3	574
2022	305	292	2	599

Source: Eurostat

## Addressees for the scheme

In terms of addressees for the scheme, in the case where entities are expected to acquire/hold allowances to 'cover' wastes sent for RWM, the question is what that entity should be. Arguably, the most desirable approach would be to require waste generators (i.e. households, businesses, etc.) to acquire allowances, as they are the entities most capable of taking actions to facilitate RWM reduction. On the other hand, at the point when waste is transferred from generator to collector, the quantity of waste ultimately sent for RWM may not be known (waste 'sent for recycling' could be contaminated, and give rise to significant losses at the sorting /reprocessing stages). In principle, that could be addressed in a suitably developed data capture system, though such a system is not yet in place across the EU-27.

In the UK's Landfill Allowances (Trading) Scheme for reducing landfilling of biodegradable municipal waste, the local authorities were responsible for ensuring they held allowances to cover the amount of waste landfilled. In the EU-27, however, local authorities' responsibilities, as regards the range of wastes they collect, are not harmonised, and in some Member States (notably, the Republic of Ireland), households contract directly with service providers.

The quantity of waste actually landfilled/incinerated is only properly known at the point where the landfilling or incineration takes place. As Table 2 shows, there are more than 2,300 landfills for non-hazardous waste, and almost 3,300 incinerators, of which more than 2,700 are classified as R1 facilities. Undoubtedly, there will be a number of companies owning/operating more than one facility, so that the number of facilities, in both cases, will overstate the number of operating entities concerned: local authorities may also be owners. Exactly how many owners there are is unclear. Nonetheless, this would imply a potentially significant number of participants being required to acquire/hold allowances. That has up- and downsides, but under the current conditions, they might be the best addressees in a market-oriented approach.

We noted above that a trading scheme for allowances for landfilling biodegradable municipal waste in England was effectively abandoned since the escalating tax on landfill effectively made the scheme redundant. It is worth considering what might happen in the market for RWM allowances as a cap was tightened.

In Member States where the costs of RWM are already relatively high, and especially those where policies to support reducing RWM are prominent (e.g. Austria, Belgium (notably Flanders, Wallonia)), the scope for additional RWM reduction may be more limited than in a Member State with low costs of RWM and weaker policies on RWM reduction. To that end, the marginal reductions in RWM might, initially, be achieved at the lowest cost in Member States with weaker performance. The allowance price would reflect the costs of RWM reduction net of the prevailing costs of RWM in that Member State. This could effectively set the allowance price for the EU-27 as a whole. That might lead to a situation where Member States that have already confronted waste generators with relatively high RWM costs would be faced with a further increase reflecting the price of allowances.

In principle, this effect can be countered through a scheme for allocation of free allowances to Member States. For example, if the aim was to set a cap on RWM of all wastes except major mineral waste, then the cap could be expressed in terms of a per capita quantity. A proportion of the total cap (this could be, at the start, a relatively high share) could then be freely allocated to Member States on the basis of their share of the EU-27 population. Those already achieving a reduction in RWM to levels below the freely allocated allowances would potentially have allowances to sell back to the market. Note, though, that this would also require some resolution of a separate issue regarding allocation of those free allowances within a Member State. A grandfathering approach would risk giving saleable assets to operators of facilities in areas within Member States where, compared to peers, waste was relatively poorly managed.

## Passive trading approaches

An alternative approach—which might be considered to play into respect for the principle of subsidiarity—would be to consider approaches where the approach to trading is somewhat more ‘passive’. In this case, instead of the addressee being directly involved in the supply chain, the entity responsible for achieving its allowance quota would become the Member State itself. In this approach, (at least) two sub-options are available:

1. **Target-based formulation:** A levy on ‘above target’ RWM per capita, with the revenue generated to be refunded to those with ‘below target’ RWM per capita;
2. **Levy-driven formulation:** A levy on ‘above average’ RWM per capita, with revenue being refunded to those Member States delivering ‘below average’ RWM per capita.

These are discussed below.

## Target-based formulation

In this case, at the EU-27 level, the aim would be to reduce RWM below a target level, set in terms of MSW per capita per year. A levy would be established that would be applied to the amount of waste by which a given Member State exceeds the target level. There is a choice as to how that revenue should be used. In order to support the incentive, it makes sense, in our view, to make the instrument 'revenue neutral'. In other words, all the revenues raised from those failing to meet the target would be paid back to those who achieve the target, in proportion to the extent of their overachievement.

So, for example, suppose the target was 200kg per inhabitant, and the incentive levy was €50 per tonne. A hypothetical Member State with a population of 2 million inhabitants that reported RWM of MSW at 215kg/inh would have to pay a levy equal to the excess quantity in tonnes  $[(0.215 - 0.200) \times 2,000,000 = 30,000 \text{ tonnes}]$  multiplied by the levy (€50/tonne) giving a payment of €1.5 million. Supposing other Member States also miss the target, and that the total amount by which the target is exceeded is 400,000 tonnes. The total revenue raised would be €20 million.

If those who are below the target quantity of RWM are under the target, in aggregate, by 500,000 tonnes, then for each tonne by which a Member State is under the target level, it would receive €40 per tonne. A hypothetical Member State with a population of 1.5 million and RWM of 160kg/inh would be under the target by 60,000 tonnes: they would receive €2.4 million in lieu of their achievement.

Under this approach, the magnitude of the levy is the key to driving action. It might be reasonable to assume that levies will have a more powerful effect in those situations where the costs of RWM are currently low. All Member States have some incentive to improve, even if they are already achieving the target, since the relative extent of their overachievement determines the share of revenue they receive from the pot generated by those who fail to meet the target. Evidently, there would be limits to that: if (for those above target levels) the costs of reducing RWM further are more expensive than the levy, then there will be no incentive to change, and similarly, for those under target levels, if costs of RWM reduction are above the likely revenue received for that effort.

All this should be considered, of course, in the light of the existing targets in EU law. To the extent that achieving existing recycling targets would significantly lower MSW managed via RWM, then that ought to shape a Member State's perception of costs: these might be rightly considered to be the costs simply to comply with existing law. Importantly, however, the RWM formulation also supports efforts to reduce not only recycling but also waste prevention.

## Levy-driven formulation

In the previous example, the combination of the target and the levy rate determines the extent to which there is a pot of revenue to be redistributed to those achieving the target. If the target is too lenient (e.g. 350kg/inh), or if the levy is set at a high rate, or both, then there might be next to no revenue generated from the levy:

everyone would (seek to) meet the target. There would be little incentive for those below the target to make further improvements.

An alternative formulation would be not to set a predefined target at all, but to use average performance outcome, in terms of kg/inhabitant RWM, as the basis for determining levy payments and the redistribution of the levy revenue. In this case, the levy plays the critical role of incentivising RWM reduction. The levy rate would be adjusted over time to deliver the desired overall level of reduction in RWM.

In principle, every Member State has an incentive to 'get below the average' level of RWM. There is a continuous incentive to improve until the point where the costs of further improvement are lower than the benefits of further improvement (subject to existing targets being met—see above). Suitably adjusting the levy rate might lead to a degree of convergence at low rates of RWM.

# Concluding remarks

A focus only on 'not landfilling' is not necessarily conducive to supporting a more circular economy. Such a focus may be more justifiable in the case of certain waste streams—notably major mineral wastes and combustion wastes—where a switch to incineration is less likely. For these types of wastes, it may be more important to limit the extent to which the 'switch' is from landfilling to 'other recovery' options. It seems possible that large quantities of material with potential for use—for example, as secondary aggregate—are currently being recovered in low-value-added applications.

Given that almost two-thirds of the waste being landfilled or incinerated consists of 'major mineral wastes', there is a risk that in a single scheme covering all waste types, the management of these wastes could dominate the scheme. Considering their very different origins, cost structures, and management options, including the possibility that they may be sent to different types of landfills, there is a strong argument for dealing with these wastes in a separate scheme. This could take the form of a cap-and-trade system, or one based on minimum tax rates. In either case, a review of the different approaches taken by Member States to the regulation of material recovery for such wastes, and of Article 24 exemptions from permitting, would be relevant. Introducing a minimum tax rate on primary aggregates might also incentivise greater value extraction from this waste stream.

Partly due to data quality considerations, we believe that, among the 'other' wastes, focusing on municipal waste makes sense in the short term, although the available data are not without their limitations. Whilst a scheme based on trading allowances suggests that the primary participants would be the operators or owners of relevant facilities (given the administrative challenges of applying such a system directly to waste generators), this does not resolve the issue that demand for allowances, and therefore allowance prices, would be influenced by existing regulations and levies in Member States, where such policy vary considerably. This variation could make it challenging to 'level the playing field' for trading.

To simplify matters, we have suggested systems of passive trading. Under such a system, Member States performing worse than target or average would be subject to a pre-set levy on their 'excess residual waste', whilst those performing better would receive from the revenue-neutral recycling fund in proportion to their 'over performance'. This approach has the advantage of focussing Member States' attention on improving their performance. However, it relies on suitably strict auditing of the scheme, as this would otherwise create incentives for inaccurate reporting.

In 2023, for the EU-27, the figure for per capita residual waste managed (RWM) in the EU-27 was 244 kg/inhabitant. In line with previous analysis, **we expect all Member States to aim for municipal solid waste (MSW) managed as RWM to fall below 175kg/inhabitant in future**, with some likely achieving significantly lower levels if MSW recycling targets are met. **This suggests that, by 2035, a reduction in RMW to around 150kg/inhabitant should be achievable using the type of passive trading mechanism described above.**



Zero Waste Europe (ZWE) is the European network of communities, local leaders, experts, and change agents working towards a better use of resources and the elimination of waste in our society. We advocate for sustainable systems; for the redesign of our relationship with resources; and for a global shift towards environmental justice, accelerating a just transition towards zero waste for the benefit of people and the planet. [www.zerowasteurope.eu](http://www.zerowasteurope.eu)



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Authors: Dominic Hogg (Equanimator Ltd)  
Editors: Janek Vähk, Nanna Bille Cornelsen  
Date: October 2025

General information: [hello@zerowasteeurope.eu](mailto:hello@zerowasteeurope.eu)  
Media: [news@zerowasteeurope.eu](mailto:news@zerowasteeurope.eu)  
Cities-related topics: [cities@zerowasteeurope.eu](mailto:cities@zerowasteeurope.eu)

[zerowasteeurope.eu](http://zerowasteeurope.eu)  
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[www.missionzeroacademy.eu](http://www.missionzeroacademy.eu)

