



The new 10% landfill target may work against the circular economy

Should we minimise percentages or tonnes?

Policy briefing

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Executive Summary

One of the cornerstones of the Circular Economy Package, adopted in 2018, is the new Landfill Directive. The strategic goals of the new Directive are largely the same as the EU policy on landfills defined in 1999. However, a key new element brought about by the new Directive is the landfill minimisation target, which obliges Member States to limit the amount of municipal waste due to be landfilled to 10% or less of municipal waste generated by 2035.

Although the landfill minimisation target seems to be aligned with the strategic goals of the Waste Framework Directive (maximisation of preparation for recycling and reuse, separate collection obligations of specific waste types) the new obligation also generates operational goals which may contradict the overarching principles of the EU Circular Economy Agenda.

The evidence shows that meeting the 10% threshold is extremely challenging and may push decision makers to invest in waste incineration so as to minimise landfilling. This may create a lock-in situation, with waste compelled to go to incineration, contravening the principles and strategic goals of the Circular Economy Package. Moreover, the threshold defined as a percentage could also discourage waste reduction measures as it wouldn't matter how much waste we generate, it only matters that we landfill 10% of it.

For this reason, Zero Waste Europe recommends to amend the landfill directive in two complementary ways, so as to align it with the overarching principles and strategic goals of the EU Circular Economy Agenda:

- Set the landfill target with reference to a baseline year, instead of “any given year”. This would reward the efforts on waste reduction, which are placed higher up in the waste hierarchy, and should be regarded as “Plan A” for sustainability.
- Adopt a landfill target in kgs of waste per person per year, instead of a percentage, so as to reward those areas (communities, local authorities) who are implementing progressive waste management strategies to minimise the generation of residual waste. The target in kgs/person/year may replace the one in percentage, or simply supplement it stipulating that either one applies.

The new Landfill Directive

One of the cornerstones of the Circular Economy Package adopted in May 2018, the new Landfill Directive¹, takes its steps from the old Landfill Directive², which it amends. Its strategic goals are largely in line with the European policy on landfills as defined back in 1999, including:

- Minimisation of biodegradable waste to landfills (Article 5 (1))
- A factual obligation for pretreatment of Municipal Solid Waste (MSW) prior to landfilling (although there are possible relaxations, to be codified for specific cases for waste for which “treatment does not contribute to the objectives of this Directive (...) by reducing the quantity of the waste or the hazards to human health or the environment”) (Article 6 (a))

As such, the amended Landfill Directive keeps acting as one of the most powerful drivers to improve the management of MSW across Europe, with particular regard to the following strategic goals:

- Minimisation of impacts from landfill sites
- Increased cost of landfilling (perhaps, one of the main drivers for improved management of resources and end-of-life materials in the last 20 years)
- Maximised diversion from landfills

A new key element brought about by the new, amended Landfill Directive (from now on, New Landfill Directive or NLD), is the landfill minimisation target as stipulated by Article 5 (5), which reads:

Member States shall take the necessary measures to ensure that by 2035 the amount of municipal waste landfilled is reduced to 10% or less of the total amount of municipal waste generated (by weight).

Apparently, the target seems to be in line with EU strategic goals, as broadly defined in the amended Waste Framework Directive³ (maximisation of preparation for reuse and recycling, obligations for separation of specific waste types, e.g. biowaste) the amended Packaging and Packaging Waste Directive⁴ and in the new Landfill Directive itself.

¹ Directive (EU) 2018/850 of the European Parliament and of the Council of 30 May 2018, amending Directive 1999/31/EC on the landfill of waste eur-lex.europa.eu/legal-content/FN/TXT/PDF/?uri=CELEX:32018L0850&from=FN

² Council Directive 1999/31/EC of 26 April 1999 on the landfill of waste eur-lex.europa.eu/legal-content/FN/TXT/?uri=CELEX%3A31999L0031

³ Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives, as amended by Directive (EU) 2018/851 of the European Parliament and of the Council of 30 May 2018

⁴ European Parliament and Council Directive 94/62/EC of 20 December 1994 on packaging and packaging waste, as amended by Directive (EU) 2018/852 of the European Parliament and of the Council of 30 May 2018

	2025	2030	2035
Minimum preparation for reuse and recycling of MSW	55%	60%	65%
Maximum landfilling of MSW	-	-	10%
Minimum recycling of packaging waste	65%	70%	-
Plastic	50%	55%	-
Wood	25%	30%	-
Ferrous metals	70%	80%	-
Aluminium	50%	60%	-
Glass	70%	75%	-
Paper and cardboard	75%	85%	-

Table 1. Overall waste management targets (WFD Art 11 §2; LD Art 5 § 5; PPWD Art 6 §1)

The 10% landfill target is generating operational goals which are in contradiction to the overarching principles of the EU Circular Economy Agenda⁵, and it is becoming a driver to boost investments in incineration and other energy recovery options⁶; evidence shows that:

- Meeting the 10% target, given the way related calculations are defined, is extremely challenging
- This may push decision makers to invest in incineration “so as to minimise landfills”

This may contravene the principles and strategic goals of the Circular Economy Package and related EU agenda, which give a clear priority to reducing waste and maximising material recovery, and may draw attention of national and local decision-makers towards the need to build WtE infrastructure, and prioritise related investments.

The foregoing may create a lock-in situation to waste incineration⁷, with residual waste compelled to go to incineration to repay for related investments, instead of being targeted by redesigning of materials found in residual waste after reduction/reuse/recycling, as it should ideally be in a truly circular system.

⁵ ec.europa.eu/environment/circular-economy/

⁶ Such as fuels.

⁷ Incinerators are expensive to build, so in order to make profit and repay the investment costs, they need a guaranteed stream of waste. Therefore, “waste-to-energy” plants require to fix a guaranteed tonnage in local waste plans, and/or compel Local Authorities to sign long-term contracts, which require them to deliver a minimum quantity of waste for 20 to 30 years, or pay fees to compensate the incinerator company for lost profits. With such contracts in place, municipalities commit to generating a certain amount of waste, instead of decreasing that amount while increasing their recycling rate.

The calculation rules: a roadmap to a wrong destination?

The way the landfill target is defined and must be calculated may cause unwanted consequences.

Principles and rules for the calculation are laid out in article 5a(1) of the NLD; this has then been supplemented by the Commission Implementation Decision (EU) 2019/1885 of 6 November 2019, which added a few details. With regard to the NLD, art. 5a(1), the following key rules apply:

- A. the weight of the municipal waste generated and directed to landfilling shall be calculated in a **given calendar year**;
- B. the weight of waste resulting from **treatment operations prior to recycling or other recovery of municipal waste**, such as sorting or mechanical biological treatment, which is subsequently landfilled shall be included in the weight of municipal waste **reported as landfilled**;
- C. the weight of municipal waste that enters **incineration disposal operations and the weight of waste produced in the stabilisation operations of the biodegradable fraction of municipal waste** in order to be subsequently landfilled shall be **reported as landfilled**⁸;
- D. the weight of waste produced during **recycling or other recovery** operations of municipal waste which is subsequently landfilled **shall not be included in the weight of municipal waste reported as landfilled**⁹.

The foregoing calculations rules include a few points worth remarking. Firstly, the fact that the landfilled waste should be calculated with regard to “a given calendar year”, and not in reference to a baseline year, undermines any beneficial effect, in this respect, of waste reduction.

In other words, **even in the most advanced waste prevention scenario, there will be the need to make efforts to minimise percentages of waste landfilled in any given year, since minimising the tonnes of waste landfilled will not be enough when measured with the definition of the landfill target.**

If this may only be met with some contribution from incineration, this will trigger related investments, which will then result in a lock-in effect, namely the need to feed designed amounts to WtE sites, going against the need for continued efforts on reduction, reuse, redesigning and recycling.

Also, while the inclusion of the rejects from Mechanical Biological Treatment (MBT) in the calculation of landfilled waste is fully agreeable, there is an unbalanced provision with regard to other residual waste management options. All waste produced by recovery operations, *including RI incinerators*¹⁰ (basically, all the new ones and most of the old ones) will be

⁸ The Commission Implementation Decision then specified materials originating from municipal waste that are subsequently recovered from waste resulting from D10 incineration disposal operations shall be deducted.

⁹ The Commission Implementation Decision then specified that (a) waste that results from checking, cleaning and repairing operations to prepare municipal waste for re-use and that is subsequently landfilled shall be included in the amount of municipal waste reported as landfilled. (b) materials which are mechanically removed during or after aerobic or anaerobic treatment of municipal bio-waste and which are subsequently landfilled shall be included in the amount of municipal waste reported as landfilled; and (c) waste produced during recycling operations of municipal waste shall be waste which is produced during recycling operations that municipal waste undergoes after the calculation point as defined in Articles 3 and 4 of Implementing Decision (EU) 2019/1004, laying down the calculation rules for the EU targets related to “Preparation for recycling and reuse”.

¹⁰ RI is defined as “use principally as a fuel or other means to generate energy”, and includes all incinerators meeting the energy efficiency criteria

fully deducted from the amounts of landfilled waste – including ashes and slags sent to landfills, which overly rewards the potential effect of using R1 incineration as a “landfill minimisation option”. The paradox is even stretched to further unbalanced mechanisms, given that rejects from sorting operations and from operations prior to reuse (which will have to be at the core of EU strategies for the management of waste), will be reported as “landfilled” (which is correct) while this is not the case for landfilled ashes from incineration.

It's clear how the current situation brings along a worrying lack of alignment between the Landfill target and the strategic EU goals included in the Circular Economy Package, related agenda and strategic provisions.

Good practices aligned with the circular economy vision

One of the most frequent and distorted consequences of the new landfill target is the calculation of the “**needed incineration capacity**” expressed by policy-makers, waste planners and investors. This capacity is based on the combined calculation of: targets on preparation for reuse and recycling (as defined in the Waste Framework Directive), and targets on landfilling (as defined by the NLD).

Typically, the proposed calculation is:

100% (total MSW generated) – 65% (reuse and recycling target) – 10% (landfill target) = 25% incineration

The calculation embeds one key mistake, in that it assumes 65% target on preparation for reuse and recycling. This equals fixing it as a “maximum target” while it is a “minimum” one. It is in the spirit (and to some extent, in the letter) of the Circular Economy Package and related Directives and Strategies, to set the bar of ambition higher and higher, progressively minimising “leakages” of materials/resources from circular management.

Europe already hosts schemes and strategies which are proving that reuse and recycling may go much further than the minimum EU target for preparation for recycling and reuse. It is worth remarking that many such situations are located in areas outside traditional leading countries and regions; which may be taken as evidence that ambitious targets in recycling, reuse, reduction, and subsequent minimisation of residuals, may be adopted and met everywhere across Europe.

One may mention Slovenia, which showed an impressive increase in separate collection rates in last decade, passing many of the traditional frontrunners (e.g. Austria, Netherlands, Switzerland) which in the meantime showed recycling rates that were basically stagnating (or even going slightly backward as in the case of Austria). Slovenia in 2018 achieved 70,8% separate collection on MSW, which should rank it as topmost performer worldwide, while the net recycling rate was 58,8%¹¹.

A similar situation may be reported from many Catalan, Basque and Welsh¹² Municipalities, and from North Eastern Italy¹³ where the regions Veneto (pop. circa 5M) and Trentino (pop. roughly 1M), achieved respectively 73,8% and 72,5% average separate collection rates in 2018. These separate collection rates should be made into net recycling rates (preparation for

¹¹ pxweb.stat.si/SiStatDb/pxweb/en/30_0kolje/30_0kolje_27_okolje_01_27000_kazalniki/2700001S.px/

¹² www.eunomia.co.uk/reports-tools/recycling-who-really-leads-the-world-issue-2/

¹³ ISPRA (Italian EPA): Rapporto Rifiuti Urbani, Edizione 2019, www.isprambiente.gov.it/it/pubblicazioni/rapporti/rapporto-rifiuti-speciali-edizione-2019

reuse and recycling), through calculations codified in the Commission Implementation Decisions 2019/1004, in order to draw comparisons with EU targets, and infer on relationships with the Landfill threshold; the latter should also take into account also rejects from sorting and recycling as stipulated in the Landfill Directive and in the aforementioned Commission Implementation Decisions 2019/1885 and 2019/1004.

Anyway, “zooming in” the datasets¹⁴, performances by Provinces (broadly equivalent to “Counties” or “Prefectures” or “Kreise” in other Member States) are even (and remarkably) higher. 16 Italian Provinces (including Oristano, based on the Central-Southern island Sardinia) achieved separate collection rates above 75%, with 4 above 80% and 2 even above 85%.

PROVINCE	POPULATION	SEPARATE COLLECTION RATE
Treviso	887.806	87,31%
Mantova	412.292	87,15%
Belluno	202.950	83,42%
Pordenone	312.533	81,63%
Parma	451.631	78,44%
Cremona	358.955	78,32%
Vicenza	862.418	78,18%
Reggio nell'Emilia	531.891	76,56%
Brescia	1.265.954	76,41%
Ferrara	345.691	76,00%
Varese	890.768	75,94%
Novara	369.018	75,67%
Monza e della Brianza	873.935	75,55%
Trento	541.098	75,51%
Bergamo	1.114.590	75,31%
Oristano	157.707	75,02%

Table 2 - Topmost performing provinces in Italy, 2018 - Source: ISPRA (Italian EPA): *Rapporto Rifiuti Urbani, Edizione 2019*

Surely, cases such as Province Treviso, covering 95 Municipalities and a population of nearly 900.000, may be a good test case to ascertain whether **full implementation of strategies and practices promoted, and to some extent, even**

¹⁴ www.catasto-rifiuti.isprambiente.it/index.php?pg=findComune

mandated, by the Circular Economy Package, would still need a consistent reliance on incineration in order to meet the Landfill threshold.

The Province Treviso was turned into a high performer by the driving example of the [Contarina District](#) (covering 50 Municipalities, and a population of 550.000), which adopted a Zero Waste Charter and is implementing the following strategies:

- Kerbside collection of recyclables
- Separate management of organics (as stipulated also by article 22 in the new WFD)
- Pay-as-you-throw schemes
- Waste reduction initiatives
- Waste audits on residual waste, so as to
 - Ascertain which materials are left behind after separation and recycling routes
 - Assess what may be done to tackle those materials
 - Engage with industry and businesses so as to redesign materials for better recyclability, and promote zero waste business models, able to cut further on residual waste

The foregoing is nothing else than a “Circular Economy agenda/roadmap”, embedding actions largely promoted by the EU Circular Economy Package; and it may be foreseen as one “mid-term scenario” for the full implementation of the EU strategies and Directives.

It should also be emphasised that the Zero Waste strategy¹⁵ not only targets separate collection and recycling, but it also includes consistent actions on waste reduction, which to some extent may conflict to maximised recycling rates (e.g. promoting tap water instead of collecting plastic bottles). Opting for a zero waste strategy, though:

- Represents a better option in relation to the EU waste hierarchy
- Supplements recycling in achieving the ultimate goal, which is minimisation of “disposal /leakages” of materials from circularity

With due regard for the latter point, it is worth stressing that Province Treviso is currently producing as little as 49 kgs/person/year residual waste, whilst 45 Municipalities have less than 40 kgs residual waste, and 12 Municipalities even less than 30 kgs.

These figures prove the potential of Zero Waste-inspired Circular Economy programmes to minimise landfilling with regard to the real entity that matters: quantities of landfilled materials, in kgs/person and subsequent total tonnages.

¹⁵ The Zero Waste Europe Masterplan is an extensive and practical guide on how to implement a zero waste strategy at the local level. zerowastecities.eu/learn/#the-masterplan

The problem is the EU landfill threshold defined as a percentage. Which implies 2 unwanted consequences, contradictory to the spirit and the letter of the EU Circular Economy strategy:

1. No emphasis on waste reduction (since the percentage would anyway have to be calculated “In any given year” on the remaining waste)
2. Drawing attention to investments in infrastructures which would cause a financial and operational lock-in, and prevent efforts on reduction and further increase in recycling/reuse; this would counter the real ultimate goal, namely the minimisation of tonnages.



Image 1 - Visualising the problem of the EU landfill threshold defined as a percentage

A test run of the calculation: how do advanced zero waste programmes perform vis-à-vis the landfill target?

With the aim to consider how the implementation of a Circular Economy agenda in most advanced areas performs in comparison with the EU Landfill target, we considered the situation of Province Treviso.

We applied the calculation method, as defined by the EC Implementation Decisions 2019/1885 and 2019/1004, to current waste management performance rates in the province, so as to assess the reliance on landfilling with regard to the landfill threshold. Some of the figures were adapted in order to foresee the effects of local operational plans for the near future.

In particular, the following was considered with regard to the calculation criteria, as defined in article 5a(1), points (b), (c) and (d) of the new Landfill Directive:

- Missing specific data on net recycling, the net recycling rates were inferred from separate collection rates, taking into account the average rejects rate from pre-sorting of recyclables and from organic recycling; with regard to purity of the separated materials, and typical ratios of impurities, the percentage of rejects¹⁶ has been fixed at 5% of total MSW
- The residual waste treatment in the area this is currently processed through an MBT site, which is mandated by the Regional plan and related operational permit, to produce Refuse Derived Fuel (RDF)¹⁷. Aligning with the zero waste strategy, the district is however considering to turn the MBT plant into a Material Recovery and Biological Treatment (MRBT)¹⁸ site, to further recover materials from residual waste. Mass-balances have therefore been derived from those typical for best practice MRBT plants, so as to consider calculations required by point (b) and (c) of Art. 5a(1) of the new Landfill Directive. In particular, the following was considered:
 - 35% recovery of materials from residuals (e.g. plastics, metals, paper)
 - 10% mass loss from stabilisation of organics
 - All the remainders being landfilled

In terms of materials to landfill, the calculation outcome is:

$$\begin{aligned}
 & 100\% \text{ (waste generated)} \\
 & - 88\% \text{ (rate of separate collection)} \\
 & + 5\% \text{ (percentage of rejects)} \\
 & - [35\% \text{ (recovered materials from MRBT)} + 10\% \text{ (mass loss through stabilisation)}] \\
 & \times 12\% \text{ (residual waste)} \\
 & = 11,6\%
 \end{aligned}$$

Where the input percentages represent:

100% = total MSW generated

88% = current percentage of separate collection of recyclables

5% = assumed percentage of rejects from sorting and recycling operations

35% = further materials recovered from the treatment of residual waste at MRBT plant

10% = mass loss through stabilisation of organics during the MRBT treatment

12% = residual waste out of total MSW

The above calculation shows that **good, zero waste inspired practices may already get closer to the 10% threshold, even without any reliance on incineration or co-incineration**. Also, further improvements in existing practices may finally help meeting the target, **although this may also need revising in the way calculations are stipulated**.

¹⁶ There are mostly plastics from sorting platforms and rejects from the organics processing site

¹⁷ Destination of RDF follows a public procurement procedure, and it may be either landfilled or sent to co-incineration or other types of energy recovery.

¹⁸ zerowasteurope.eu/2013/05/what-to-do-with-the-leftovers-of-zero-waste/

Key remarks - a target working against the circular economy?

The Circular Economy agenda requires, first and foremost, flexibility in the waste management system, so as to keep working on the highest levels of the hierarchy (reduction, reuse, recycling, supplemented by redesign as in the zero waste hierarchy¹⁹) which results in continued minimisation of residual waste going to disposal. Hence, reliance on infrastructures that require fixed tonnages so as to ensure pay-backs, should be avoided as much as possible. In this respect, the Circular Economy is all about keeping materials in the loop, in their highest status, for as long as possible, therefore incineration (and other types of WtE) contradicts with the ultimate goals of maximising recovery of materials and minimising leakages from circular management of resources.

The EC Communication²⁰ from January 2017 has already emphasised the foregoing, calling on Member States with high incineration capacity to start phasing out excess incinerators, and warning countries with low capacities against excess investments in incineration. Remarkably, best performing areas like Slovenia and Veneto Region²¹, moved away from massive incineration plans in the past few years, which kept them aligned with the zero waste vision, thereby unleashing the full potential of the Circular Economy. **The key problem with the current Landfill target definition and related calculations, is the fact it is defined as a percentage. This goes against good sense, since what gets into landfills are tonnages, not percentages.** Hence, one may incur the paradox that some regions could meet the landfill target, landfilling less than 10%, but that percentage may translate into a higher reliance on landfills in terms of kgs/person (see Table 3).

	DENMARK 2018	PROVINCE TREVISO, ITALY 2018
Specific waste arisings kgs/person	766	388
Incinerated waste kgs/person	392	0
Residual waste kgs/person		49
Slags/ashes (25% of incinerated waste) kgs/person	98	

Table 3: Direct comparison of amounts of slags and ashes discarded from incinerators in areas with a high reliance on incineration (left), and amounts of residual waste in areas which, having adopted a zero waste strategy, didn't invest into incineration and keep working on reduction-reuse-recycling-redesigning (right). Source: Eurostat for Denmark appsso.eurostat.ec.europa.eu/nui/show.do and SPRA, Italian EPA, for Italy www.catasto-rifiuti.isprambiente.it/index.php?pg=regione

¹⁹ Zero Waste Hierarchy. Available at: zerowastecities.eu/discover/

²⁰ The Commission Communication on The role of waste-to-energy in the circular economy ec.europa.eu/environment/waste/waste-to-energy.pdf

²¹ With specific regards to the once planned incinerator in Lubiana, whose plans were then given up, and the 2 incinerators once planned in Province Treviso, then equally given up.

Some municipalities or districts which have committed to zero waste programmes, are currently producing less than 30 kgs/person/year of residual waste, an amount which is lower than the total amount of slags and ashes coming from incineration in countries with a high reliance on WTE²².

Intuitively, a threshold on landfilling defined as a percentage, also does not put emphasis on prevention. As already highlighted, the fact the threshold must be met *in any given year* (and not relative to a baseline year) minimises the beneficial impact of waste reduction. It may actually even work against it, since it may be better for local authorities to keep a high presence of recyclable materials in MSW (e.g. PET bottles) so as to maximise incidence of recycling on MSW and get closer to the 10% threshold, instead of promoting strategies and practices to reduce those materials.

Amending the landfill target for better alignment with a circular economy

All the reflections above point towards the need for possible future amendments to the target and related calculations. We have singled out potential complementary ways of improving the landfill target, so as to align it with the overarching principles and strategic goals of the EU Circular Economy Agenda:

1. **Set the landfill target with reference to a baseline year** instead of “any given year”. This would reward the efforts on waste reduction, which are placed higher up in the waste hierarchy, and should be regarded as “Plan A” for sustainability.²³
2. **Adopt a landfill target in kgs/person.year**, instead of a percentage, so as to reward those entities (communities, local authorities) who are implementing progressive waste management strategies to minimise the generation of residual waste. The target in kgs/person.year may replace the one in percentage, or simply supplement it, stipulating that either one applies.

²² As already remarked, those amounts of slags/ashes are not counted as “landfilled” if the incinerator meets the R1 efficiency formula. This looks unfair and misleading to decision-making.

²³ In own words of the EC Vice President Frans Timmermans, recycling is not the best we may do, reduction and reuse should be given the priority and will be more focussed in future EU provisions,

www.endseurope.com/article/1665256/timmermans-european-green-deal-include-tougher-action-plastics

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Zero Waste Europe is the European network of communities, local leaders, businesses, experts, and change agents working towards the same vision: phasing out waste from our society. We empower communities to redesign their relationship with resources, to adopt smarter lifestyles and sustainable consumption patterns, and to think circular.



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