

RECENT CLAIMS BY TWO LOCAL RESEARCHERS – SIRRL RESPONDS

Recently SIRRL was approached by media to ask about claims from two local researchers after reading an interview with Energy from Waste (EfW) expert and SIRRL Board Member Herman Sioen when he was in Aotearoa New Zealand for community meetings. That article can be read at <https://www.stuff.co.nz/timaru-herald/news/131664931/proposed-wastetoenergy-plant-described-as-best-of-the-best-and-a-need-for-every-community>.

Below is the response to those claims, including graphs to back up these responses, from both Herman and SIRRL Director Paul Taylor:

- 1. They say Incinerators made sense in Europe and elsewhere decades ago when they were generating electricity that would otherwise have been generated using coal or gas. Gradually they make less sense as electricity grids are decarbonised – and they make very little sense in New Zealand where the grid is already over 80% renewable energy. What does SIRRL have to say about this statement?*

SIRRL Director and Energy from Waste expert Herman Sioen says:

Energy from Waste plants are built to treat residual waste and energy production is a further benefit. The production of energy, (electricity and/or heat) also reduces the cost (for the citizen) of waste treatment and helps to reduce the dependency on fossil fuels. Project Kea is a project to primarily deal with New Zealand's waste crisis but will generate renewable energy in the process that will benefit the local district.

'Europe' is not a single country, there are large differences between each nation, including economies, level of natural resources etc. (Some countries are lucky enough as New Zealand to have much hydropower, others depend heavily on fossil or nuclear fuel and, in addition, the war in Ukraine has rocked the energy situation across Europe. Compared to the other sources, the contribution from such plants may not be comparatively huge but it does assist.

- 2. Another claim (as opposed to the European view of SIRRL director Herman Sioen) was that Incinerators are not considered part of the Circular Economy (CE) or suitable for sustainable development finance in Europe, and governments and businesses are backing away from their use and some (e.g., in Denmark) are being decommissioned. In the UK even some of the large incinerator operators have called for a moratorium on any further ones being built since they are not compatible with a move to a more CE and actually take material that could now be recycled, with a far greater carbon benefit in doing so. What does SIRRL have to say about this statement?*

Herman Sioen says:

EU waste management policy is based on a number of key principles. These include:

- Proximity: each (country, region) should take care of its own waste as much as possible
- The waste hierarchy (avoid, reduce, reuse, recycle etc.). In this hierarchy, Energy from Waste technology is defined as the better option for non-recyclable waste, with landfills at the bottom of the hierarchy. I understand this is also the case in

New Zealand's recently released waste strategy
<https://www.beehive.govt.nz/release/standard-kerbside-recycling-part-new-era-waste-system>.

- EU waste directive in which landfilling of waste is in principle not allowed. Exceptions are tolerated, in particular only to the poorer or recent member states.

'Circular Economy' is a much wider concept and not just related to waste. However, it is accepted that Energy-from-Waste contributes to the circular economy by:

- Providing a hygienic service to the community by treating non-recyclable combustible waste and pollutants, which would otherwise end up in landfills.
- Providing secondary raw materials from incineration residues, a process known as material recovery.
- Recovering energy from waste and providing a local and reliable source of renewable electricity, heat, hydrogen, and fuels, substituting fossil fuels, and strengthening the EU's energy security.
- Recovering the emitted carbon from its processes through carbon capture technologies and producing further products and fuels.

In an ideal world the circular economy will reduce the amount of waste, 'to zero'. The reality is that the amount of waste in the EU has largely remained the same or even increased (see graphs below in on total waste generated (2010 vs 2020) and municipal solid waste (MSW) generated 2006-2021), some countries see a small decrease, others an increase. Even though the EU, national governments and waste authorities continue to launch waste reduction campaigns.

The EU 'taxonomy' directive will make Energy from Waste financing more difficult for financial institutions. However this directive is not yet complete and the debate is ongoing. There could be a conflict with other EU directives that force waste authorities to treat waste correctly. Proponents call this taxonomy directive a means to go to 'zero waste' but the reality is different. There is still an enormous amount of waste and reduction is going very slowly (if at all).

On the situation in Denmark:

- Denmark is a highly developed country and has been a leader in waste management in Europe. It has a small population but has been treating all its waste according to the EU principles for a very long time. This means that it recycles waste very well (60% see graphs below) and uses Energy from Waste for the remaining waste. As a result, it now has more EFW capacity than required for its own waste so treats waste from other countries (mainly UK). As the UK is no longer an EU member, and as burning waste from other countries is not in line with the proximity principle, it has indeed decided to reduce its EFW capacity. This is totally in line with the EU policy, and I believe this is a good thing.
 - When you compare Denmark with New Zealand, the difference is stark. Currently New Zealand has no Energy from Waste capacity and only landfills (which are at the bottom of the circular economy)
- On the situation in the UK:
 - For a long time, the UK had low Energy from Waste capacity and relied on landfilling.
 - As an EU member it had to and has tried to bring its waste management in line with the EU by building a large number of EFW plants and imposing a high landfill tax.

- The high landfill tax has allowed waste management companies and local authorities to export waste to the continent rather than send it to the landfill in the UK.
- Now that the UK is no longer an EU member the situation/policy may change but currently, the UK treats approx 60% of its residual waste through Energy from Waste plants
- There is a “moratorium’ on new EFW plans in Scotland (also in Wales), but the government wants to keep the capacity in line with production. In Scotland six EFW plants are now in operation and **11** more have been approved and can be built. I would call this a ban on ‘too much capacity’, but not a ban on EFW.
- It is correct that the company Biffa has called for a moratorium Biffa (Belgium, not UK) was one of my previous employers They missed the boat of new EFW plants in the UK and are now strong in recycling and recovery projects.
- In general, I agree that any country should tune its EFW capacity on its own residual waste production.

3. *One researcher says New Zealand as a whole does not produce enough waste to run the plant efficiently. They also questioned how the logistics around transporting the waste to Glenavy would work.*

Herman Sioen says:

This is not correct. New Zealand has a population (5.1 M inhabitants) the size of Denmark (23 plants for 5.8 M inhabitants) or Flanders (10 WTE plants for 6.6 M inhabitants.). Switzerland (30 plants for 8.7 M inhabitants.). (See map of No. Of plants per country: <https://www.cewep.eu/interactive-map/>)

SIRRL Director Paul Taylor says:

There was an estimated 1,800,965 tonnes of waste in the South Island that went to Class 1 and 2 landfills and farm dumps in 2021, much of which could have instead gone to an Energy from Waste plant. Project Kea will look to secure approximately 20% (or 365,000 tonnes) of that volume.

To support the advice provided by potential waste suppliers, the Ministry for the Environment has identified that the following waste went to landfill during the 2015 to 2021 period:

Year	North Island Class 1 Landfill tonnage received	South Island Class 1 Landfill tonnage received	Total
2015	3,222,415.37	727,951.58	3,950,366.95
2016	3,404,947.65	702,947.11	4,107,894.76
2017	3,494,308.76	736,514.46	4,230,823.22
2018	3,705,275.47	730,206.93	4,435,482.40
2019	3,499,671.95	707,455.29	4,207,127.24
2020	3,382,918.60	742,148.74	4,125,067.34
2021	3,537,798.32	804,686.46	4,342,484.78

(Table 1: Modified from MfE, OIA response dated 12 August 2022)

(On transporting waste to Glenavy please see answer to question 6 below).

4. *They say growing research around the world is finding filtration systems in Waste to Energy plants aren't effective, or they are effective to an extent, and they are not going to block out 100% and the effectiveness is only based on peak efficiency.*

Herman Sioen says:

Well, if 100% efficiency is the new target, that is indeed very difficult... At best the emission measurement is limited technically by the detection value. It is not possible with current instruments to measure with absolute scientific certainty 'zero', there is always going to be a non-zero detection limit. Thus 100% efficiency is not possible. This is also the case regarding emissions from landfills, coal and wood burning sources currently in New Zealand.

However, modern EFW plants are equipped with very efficient flue gas cleaning ('filtration') systems, much more than other polluting industries (such as steel, cement, chemical industry etc.). Emission standards are also much more stringent for EFW plants than for a number of other industries.

The SIRRL project has a 7-step flue gas cleaning system with double filtration for each pollutant, i.e. for each pollutant there is a back-up in case one step for some reason fails.

In addition, SIRRL pays attention to emission monitoring in all conditions as we explained during the presentations to the Waimate community earlier this year. This includes a continuous dioxin monitoring system.

5. *They claim international investors for a waste-to-energy plant have nowhere else to go and have come to the last remaining countries and jurisdictions who don't yet have experience of these technologies because their technology is dying overseas.*

Herman Sioen says:

International investors will look at the merits of each project before investing. Globally only 11% of the waste is treated through Energy from Waste technology. So, I'd say globally there is still a lot of work to be done for all kinds of waste management, including much work for technology suppliers, contractors and operators. For example, there are only 60 Energy from Waste plants in the USA treating approx 25 million tons, with 146 million tons still going to landfill! Australia is the latest country to building Energy from Waste plants to deal with its waste problem.

6. *They questioned the company's choice to build the plant in a small community like Glenavy instead of a major centre and are picking off vulnerable communities, and they are also 'picking off' Iwi.*

Paul Taylor says:

The Glenavy site we've chosen is centrally located between the South Island's main waste sources and with Timaru and Oamaru close by, it's a good location to also serve those urban centres, as well

as a midway point between Dunedin and Christchurch. The sorting and recycling of waste is also transported around New Zealand to obtain the most efficient way of dealing with recyclable material.

Importantly, the site is also close to major rail, state highway and electricity infrastructure. The plant will generate around 30MW of electricity, which will be fed into the Alpine Energy network that serves the area. Not only will this support future load increases on the Alpine Energy network, but it will also improve electricity supply to local homes and businesses.

Meanwhile, next month the outcome of the independent Commissioner's decision on processing SIRRL's resource management application in regard to the very important and necessary Cultural Impact Assessment should be known. In the meantime we continue to work with the local iwi's consultants on this key document and continue to hold these assessments, and the local iwi, in high regard.

7. They claim if the waste-to-energy plant goes ahead it reduces the incentive to reduce waste and is a barrier for New Zealand's goals to move towards a circular economy

Paul Taylor says:

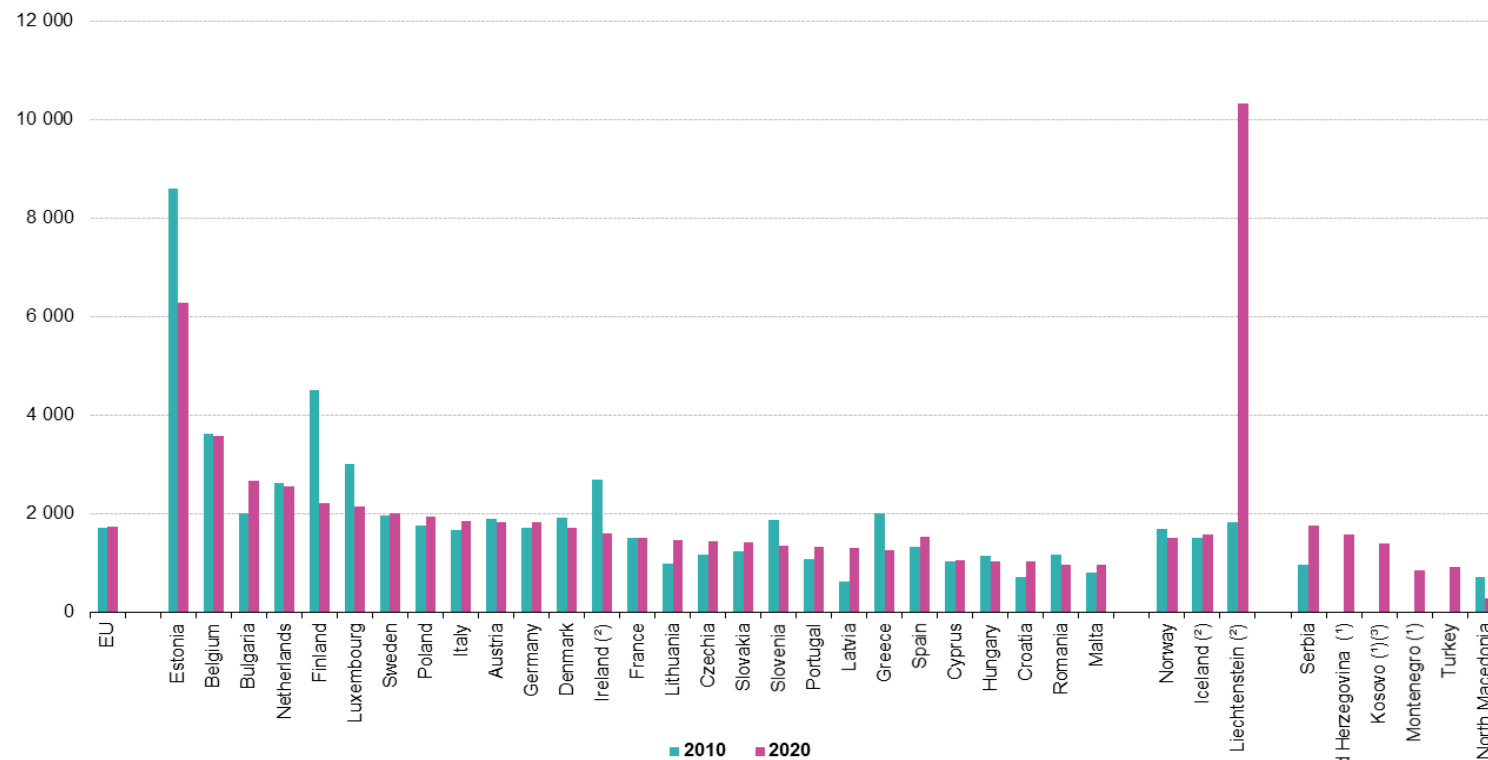
This is an opinion often used by opponents of Energy from Waste (EFW) plants and is contrary to those European countries who developed the now internationally accepted waste hierarchy as part of the move towards a circular economy .

Significantly, we've never found an example of countries where the waste production went up after the introduction of an Energy from Waste plant. Instead, the data shows that the countries with fully developed EFW capacity for residual waste are also the countries with the highest recycling rate and often with the lowest amount of residual waste per capita. Examples are Belgium, Germany, Netherlands, Denmark, Switzerland, Austria and even the UK.

Remember, we're only talking about residual, non-recyclable waste that currently goes to landfill. There is a real cost of landfilling, its impact on the environment, climate and future generations which appears to continue to be ignored.

SUPPORTING DOCUMENTS

Waste generation, excluding major mineral waste, 2010 and 2020
(kg per capita)



Note: sorted on 2020 data.

(*) 2010: not available.

(*) 2018 value.

(*) This designation is without prejudice to positions on status, and is in line with UNSCR 1244/1999 and the ICJ Opinion on the Kosovo Declaration of Independence.

Source: Eurostat (online data code: env_wasgen)

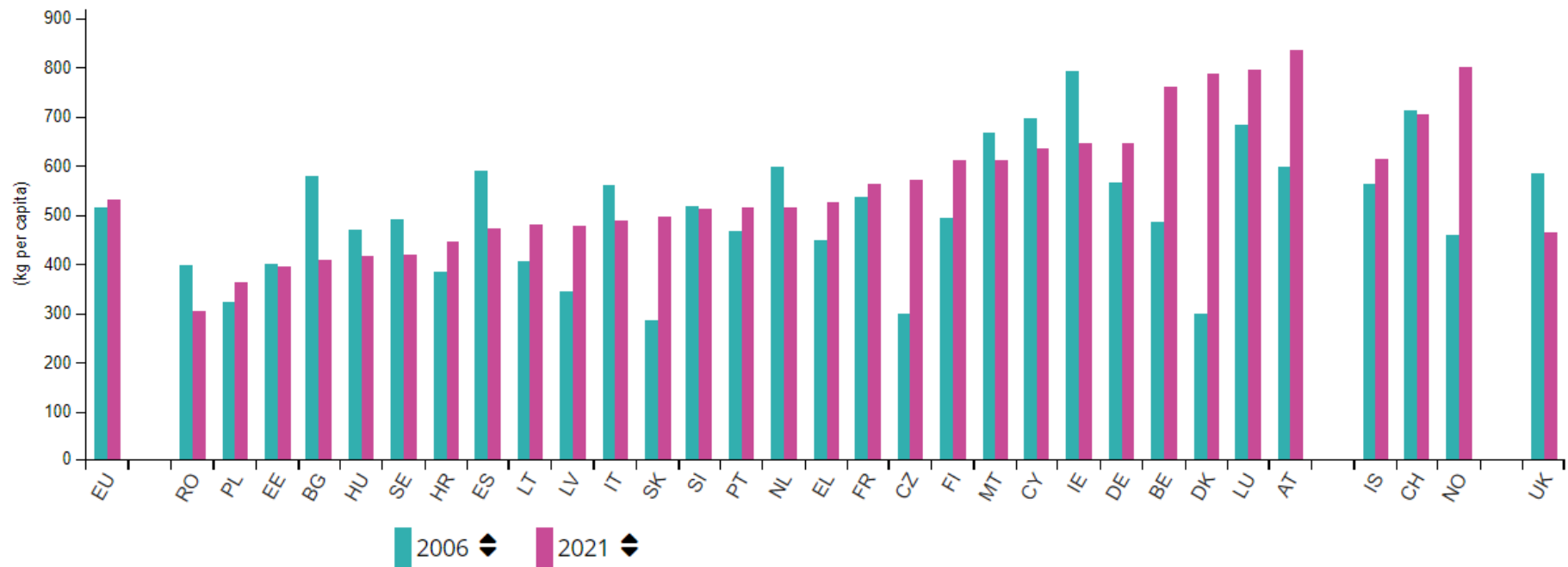
eurostat 

Figure 1: Waste generation, excluding major mineral waste, 2010 and 2020

Source: [Eurostat](https://ec.europa.eu/eurostat)

Total waste generation in EU

Municipal waste generated 2006 and 2021



Countries are ranked in increasing order by municipal waste generation in 2020.

EU: estimated.

2020 data: Bulgaria, Latvia, Italy, Portugal, Ireland, Austria, Iceland.

2019 data: Greece.

2018 data: UK.

Source: Eurostat (online data code: env_wasmun)

eurostat

Figure 2: Municipal waste generated 2006 and 2021

Source: Eurostat ([env_wasmun](#))

EUROSTAT DATA on total waste treatment in Europe

Total Waste treatment in the EU

In 2020, some 1 971 million tonnes of waste were treated in the EU. This does not include exported waste but includes the treatment of waste imported into the EU. The reported amounts are therefore not directly comparable with those on waste generation.

Figure 3 shows the development of total waste treatment in the EU, as well as for the two main treatment categories – recovery and disposal – during the period 2004-2020. The quantity of waste [recovered](#), in other words recycled, used for backfilling (the use of waste in excavated areas for the purpose of slope reclamation or safety or for engineering purposes in landscaping) or incinerated with energy recovery grew by 29.4 % from 870 million tonnes in 2004 to 1 164 million tonnes in 2020; as a result, the share of such recovery in total waste treatment rose from 45.9 % in 2004 to 59.1 % in 2020. The quantity of waste subject to disposal decreased from 1 027 million tonnes in 2004 to 806 million tonnes in 2020, which was a decrease of 21.3 %. The share of disposal in total waste treatment decreased from 54.1 % in 2004 to 40.9 % in 2020.

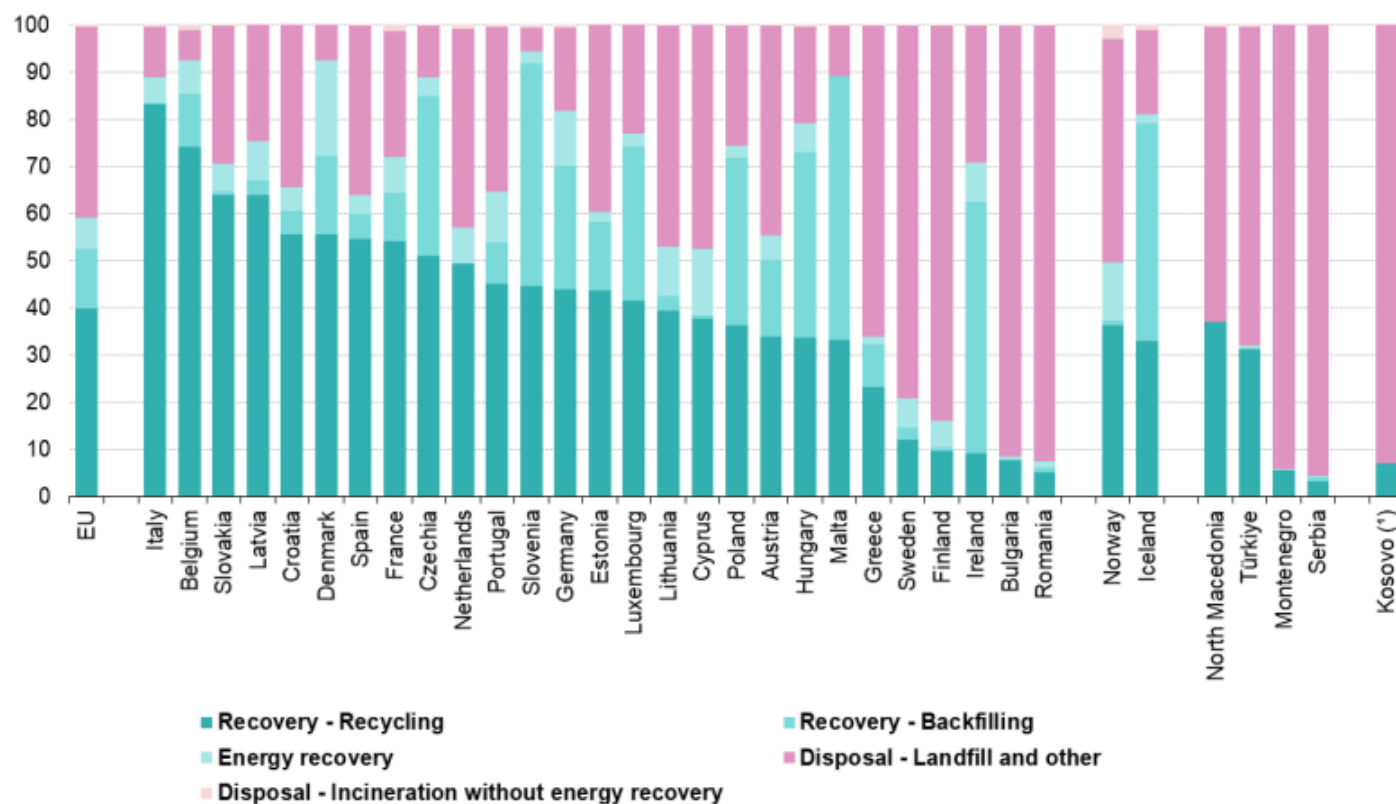
Waste treatment, EU, 2004-2020
(Index 2004 = 100)



Figure 3: Waste treatment
EU, 2004-2020
(Index 2004 = 100)
Source: Eurostat ([env_wastrt](#))

In the EU in 2020, more than a half (59.1 %) of the waste was treated in recovery operations: recycling (39.9 % of the total treated waste), backfilling (12.7 %) or energy recovery (6.5 %). The remaining 40.9 % was either landfilled (32.2 %), incinerated without energy recovery (0.5 %) or disposed of otherwise (8.2 %). Significant differences could be observed among the EU Member States regarding the use they made of these various treatment methods. For instance, some Member States had very high recycling rates (Italy, Belgium, Slovakia and Latvia), in others landfill is the prevailing treatment category (Romania, Bulgaria, Finland, Sweden and Greece, see Figure 4).

Waste treatment by type of recovery and disposal, 2020 (% of total treatment)



(*) This designation is without prejudice to positions on status, and is in line with UNSCR 1244/1999 and the ICJ Opinion on the Kosovo Declaration of Independence.

Source: Eurostat (online data code: env_wastrt)

Figure 4: Waste treatment by type of recovery and disposal, 2020 (% of total treatment)
Source: Eurostat (env_wastrt)

EUROSTAT DATA on MSW treatment in Europe

Municipal waste treatment

In this section, differences in the management of municipal waste are shown and treatment strategies are identified based on reported amounts of municipal waste [landfilled](#), [incinerated](#), [recycled](#) and [composted](#). EU Member States are asked to distinguish between incineration with and without energy recovery^[1]. In this article only the total amount incinerated is analysed.

Table 2 shows the amount of municipal waste treated in the EU for the period 1995 to 2021 by treatment method, in million tonnes and in kg per capita. Figure 6 shows the amount of waste generated at EU level and the amount of waste by treatment category (landfill, incineration, material recycling, composting and other).

Municipal waste landfilled, incinerated, recycled and composted, EU, 1995-2021

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Change 2020/1995 (%)
million tonnes																												
Landfill	121	117	117	114	113	112	107	104	99	93	88	88	87	83	82	79	74	67	63	59	57	54	53	53	55	53	54	-55
Incineration	30	30	33	33	34	36	37	39	39	41	45	48	49	51	52	53	55	54	56	57	57	58	59	59	59	0	62	107
Material Recycling (*)	23	26	30	32	37	38	40	43	43	43	46	47	52	53	54	55	56	58	56	59	63	65	66	67	67	69	70	203
Composting	14	16	17	18	19	23	23	24	24	26	26	27	28	30	30	29	29	30	31	33	33	36	38	38	39	43	45	218
Other	10	13	12	11	12	11	12	12	12	13	16	13	11	10	7	6	6	6	5	4	4	5	4	5	0	0	0	-100
kg per capita																												
Landfill	286	276	276	266	263	262	250	241	229	215	202	202	199	190	186	178	167	153	142	134	127	121	120	119	124	119	121	-58
Incineration	70	71	77	78	79	84	87	90	90	95	103	111	112	116	117	121	125	122	127	128	128	131	133	132	131	137	141	102
Material Recycling (*)	54	62	69	75	85	87	92	100	100	100	105	109	119	120	123	125	128	130	128	134	141	146	148	149	150	154	157	188
Composting	33	38	41	42	45	53	54	57	57	59	59	61	64	69	67	66	66	69	71	73	75	82	85	85	87	97	100	202
Other	23	31	28	27	28	27	27	27	28	31	37	30	24	23	17	13	13	13	11	9	9	10	10	11	8	11	11	-53

(*) including preparation for reuse

Note: estimated by Eurostat.

Source: Eurostat (online data code: env_wasmun)

eurostat 

Table 2: Municipal waste landfilled, incinerated, recycled and composted, EU, 1995-2021

Source: Eurostat ([env_wasmun](#))

The 'other treatment' category was calculated as the difference between the sum of the amounts treated and the amounts of waste generated. This difference arises in countries that have to estimate waste generation in areas not covered by a municipal waste collection scheme and thus report more waste generated than treated. In addition, the 'other treatment' category reflects the effects of import and export, weight losses, double-counting of secondary waste (e.g. landfilling and recycling of residues from incineration), differences due to time lags, temporary storage and, increasingly, the use of pre-treatment, such as [mechanical biological treatment \(MBT\)](#). This may even lead to a rise in 'other treatment' for a given year. At EU level, these effects contribute only marginally and tend to cancel each other out. However, at country level, the effects can be considerable.

Even though more waste is being generated in the EU, the total amount of municipal waste landfilled has diminished. In the reference period, the total municipal waste landfilled in the EU fell by 67 million tonnes, or 55 %, from 121 million tonnes (286 kg per capita) in 1995 to 54 million tonnes (121 kg per capita) in 2021. This corresponds to an average annual decline of 3.0 %. Also, for the shorter period 2006-2021, landfilling has fallen by 3.0 % per year on average.

As a result, the landfilling rate (landfilled waste as share of generated waste) in the EU dropped from 61 % in 1995 to less than 23 % in 2021.

This reduction can partly be attributed to the implementation of European legislation, for instance [Directive 62/1994](#) on packaging and packaging waste. By 2001, EU Member States had to recover a minimum of 50 % of all packaging put on the market. With the revised recovery target of 60 % to be achieved by 31 December 2008, there was a further rise in the amount of packaging waste collected separately. By 31 December 2025 65% of the packaging waste has to be recycled.

Furthermore, [Directive 31/1999](#) on landfill stipulated that EU Member States were obliged to reduce the amount of biodegradable municipal waste going to landfills to 75 % by 16 July 2006, to 50 % by 16 July 2009, to 35 % by 16 July 2016 and to 10% until 2035. The reduction was calculated on the basis of the total amount of biodegradable municipal waste produced in 1995. The Directive has led to countries adopting different strategies to avoid sending the organic fraction of municipal waste to landfill, namely composting (including fermentation), incineration and pre-treatment, such as mechanical-biological treatment (including physical stabilisation).

As a result, the amount of waste recycled (material recycling and composting) rose from 37 million tonnes (87 kg per capita) in 1995 to 115 million tonnes (257 kg per capita) in 2021 at an average annual rate of 4.3 %. The share of municipal waste recycled overall rose from 19 % to 49 %.

The European Commission adopted an ambitious [Circular Economy Package](#), which includes revised legislative proposals on waste with a higher common target for the recycling of municipal and packaging waste and lower limits for landfill of municipal waste.

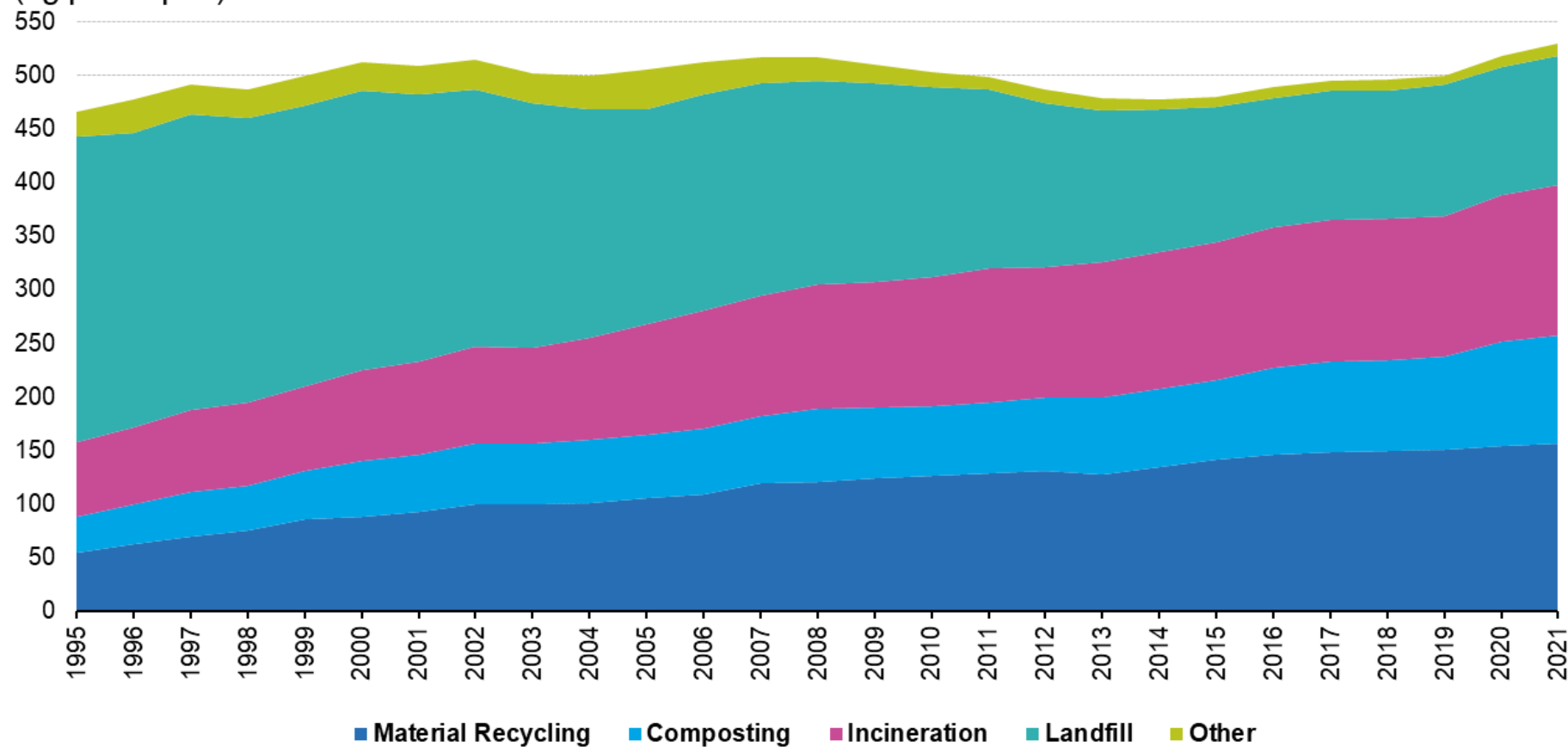
Waste incineration has also grown steadily in the reference period, though not as much as recycling and composting. Since 1995, the amount of municipal waste incinerated in the EU has risen by 32 million tonnes or 107 % and accounted for 62 million tonnes in 2021. Municipal waste incinerated has thus risen from 70 kg per capita to 139 kg per capita.

Mechanical biological treatment (MBT) and sorting of waste are not covered directly as categories in the reporting of municipal waste treatment. These types of pre-treatment require an additional final treatment. In practice, the amounts delivered to mechanical biological treatment or sorting should be reported on the basis of the subsequent final treatment steps. However, the way these amounts are allocated to the four treatment categories (incineration, landfilling, recycling and composting) varies significantly and some countries report only on the first (pre-)treatment step.

As a consequence, reporting on the current set of variables often requires additional information to relate the amounts of municipal waste landfilled, incinerated, recycled and composted to the amounts generated at country level.

Municipal waste treatment, EU, 1995-2021

(kg per capita)



Note: estimated by Eurostat.

Source: Eurostat (online data code: env_wasmun)

eurostat 

Figure 6: Municipal waste treatment, EU, 1995-2021

(kg per capita),

Source: Eurostat ([env_wasmun](#))



Municipal waste treatment in 2019

EU 27 + Switzerland, Norway and the UK

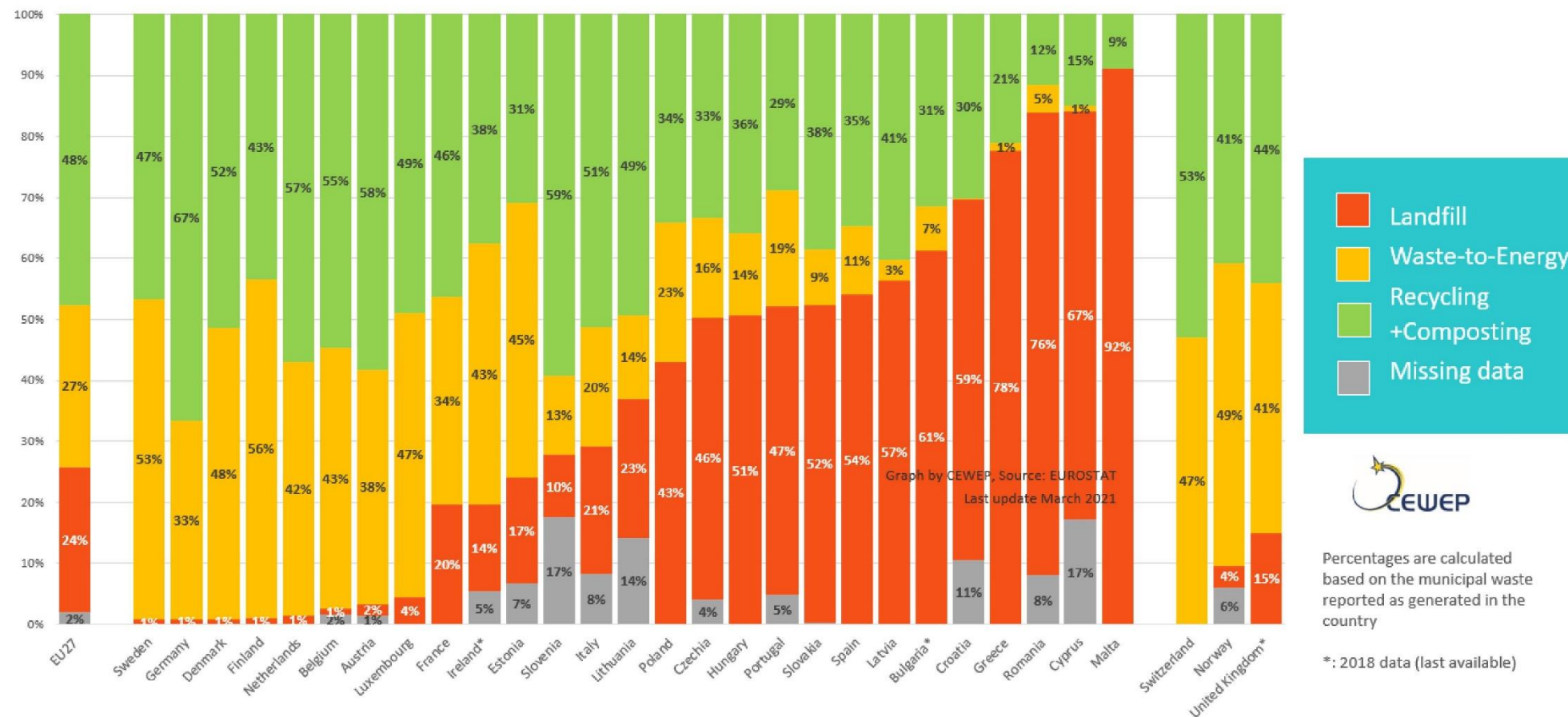


Figure 7: Municipal waste treatment in 2019

Source: <https://www.cewep.eu/municipal-waste-treatment-2018/>

Percentages are calculated based on the municipal waste reported as generated in the country

*: 2018 data (last available)