Rethinking the EU Landfill Target

ZWE Webinar:
Making the EU residual waste policy fit for a circular economy

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The Issue

We want to reduce residual waste, but we want to manage it well in the meantime…..

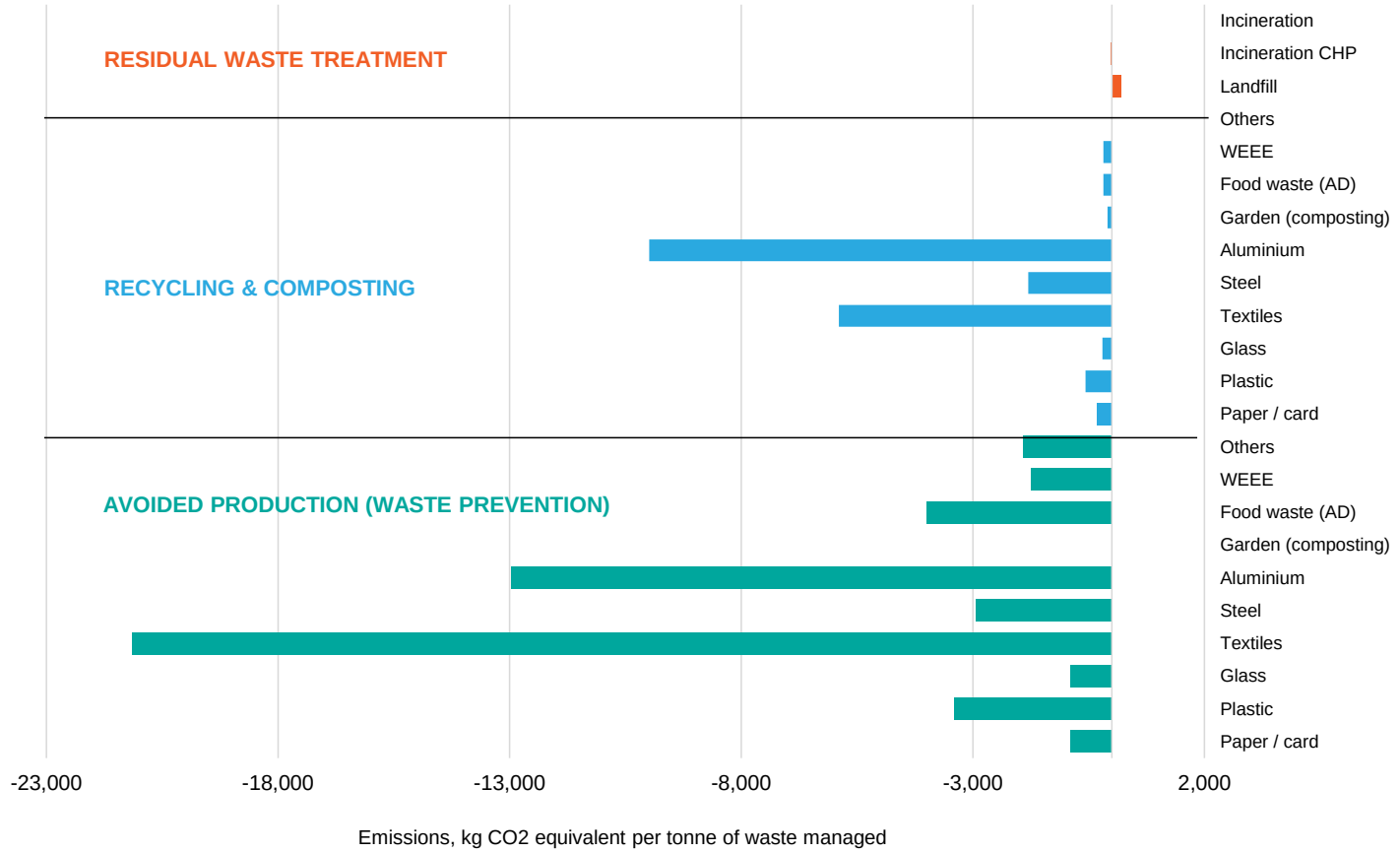
A treatment that performs comparably well on environmental grounds…

… and doesn't hinder improvements in waste prevention and recycling

Once we are in the lower levels of the waste hierarchy, the battle has been lost

The argument between 'final treatments' can seem like a battle over the 'scraps'..

.. Or is it?



Source: Eunomia

The Background

Energy, and Especially Power, is Decarbonising

EU-ETS

… plus renewables support policy

… plus carbon taxes

Significant decarbonization of power

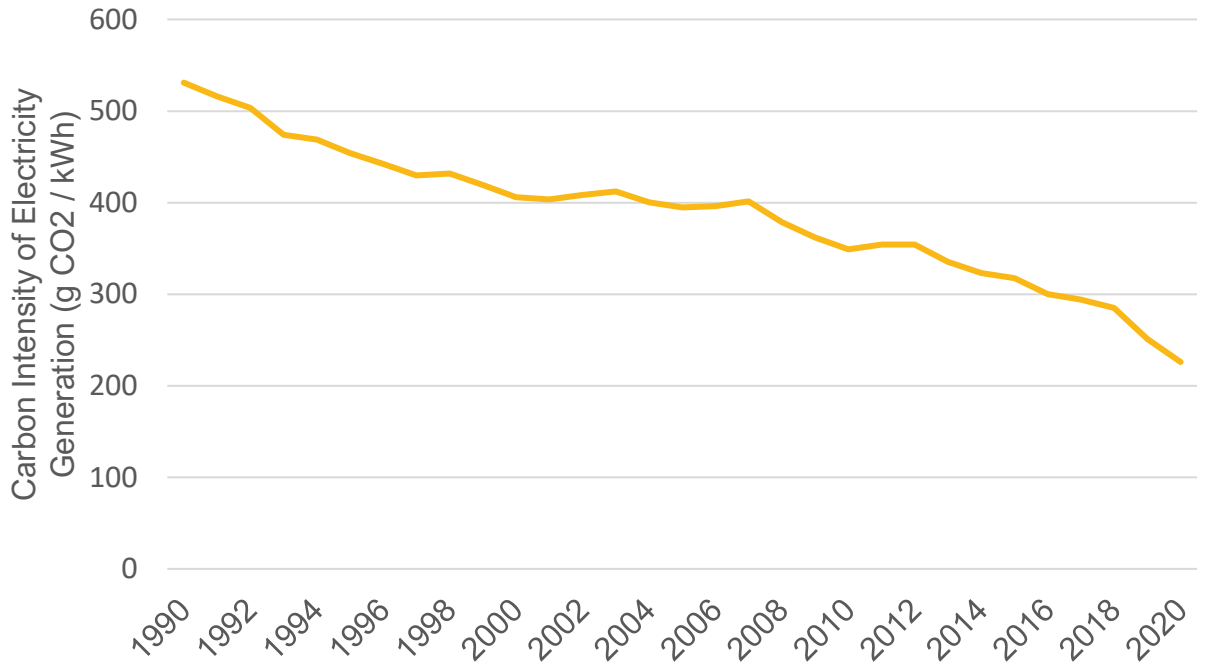
- From 531 gCO_2/kWh in 1990 to 226 gCO_2/kWh in 2020

Different rates across EU

And heat decarbonizing at a different rate (not affected by same policies / technical possibilities)

Why does this matter?

- Reduces credit for energy
- Incineration (and landfill)



Source: based on data from EEA to 2017, and from Ember estimates from 2018-2020 inclusive

CO_2 intensity banding for power (g CO_2/kWh)

0-50	51-100	101-150	151-200	201-250	251-300	301-350	351-400	>400
Sweden	Austria	Denmark	Belgium	Hungary	Ireland	Netherlands	Bulgaria	Cyprus
	Finland	Lithuania	Croatia	Italy			Czechia	Estonia
	France		Spain	Romania			Malta	Greece
	Latvia			Slovenia				Poland
	Luxembourg							
	Slovakia							

The Background

Damage costs associated with key pollutants are increasing

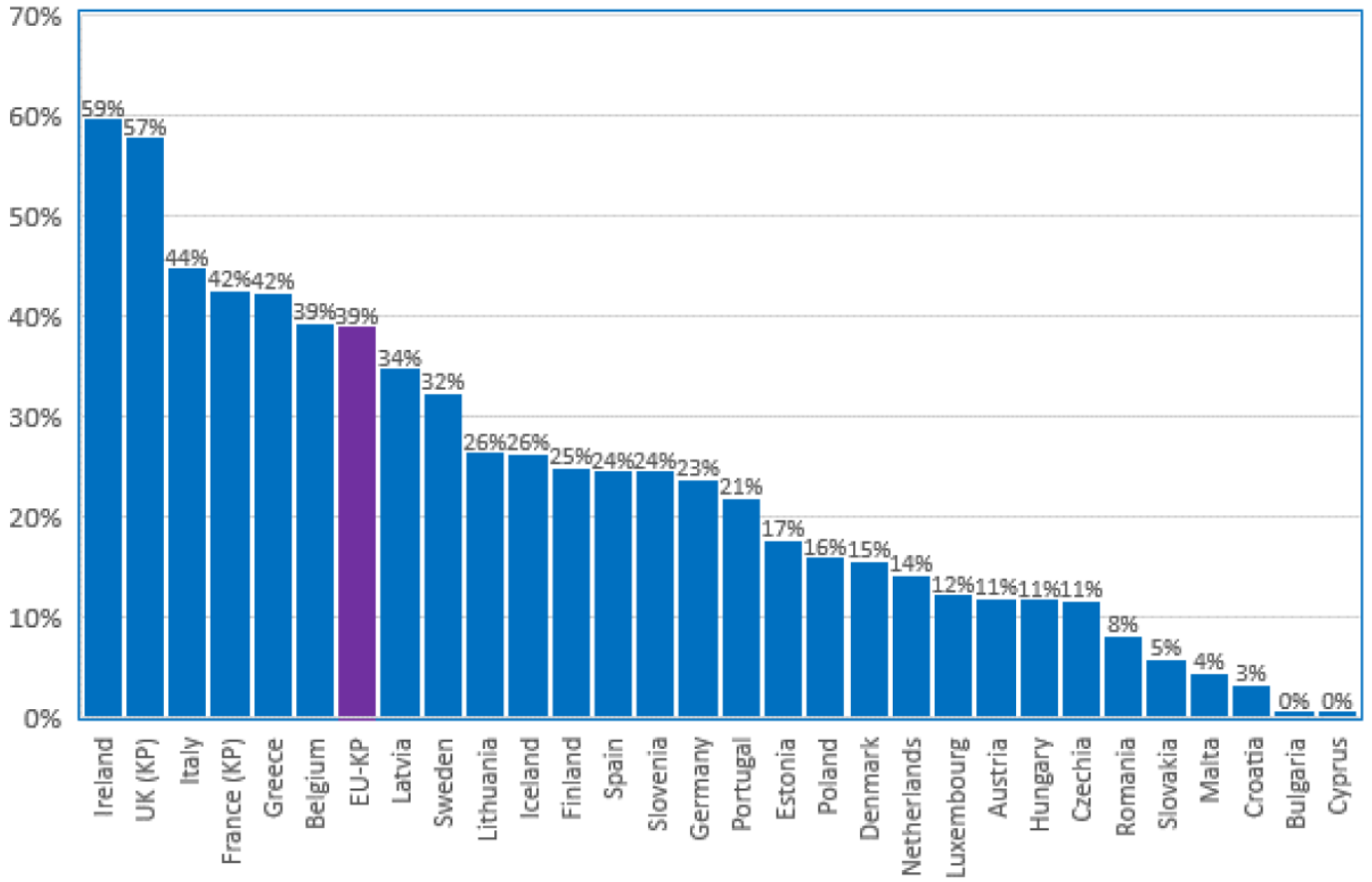
Climate Change

- For landfill, methane is critical
- For incineration (fossil) carbon in waste = fossil-derived CO_2

Air quality

- NOx emissions
- (particulate matter)
- (other pollutants)

Disamenity?



CH_4 recovery and flaring in % = (CH_4 recovery in Gg + CH_4 flared in Gg)/ (CH_4 recovery in Gg + CH_4 flared in Gg + CH_4 emissions 5A1/0,9 in Gg)
CH_4 emissions from 5A2 unmanaged landfills are not included in this calculation
Source: CRF 2021 Table 5A

Source: EEA

EU Landfill Emissions

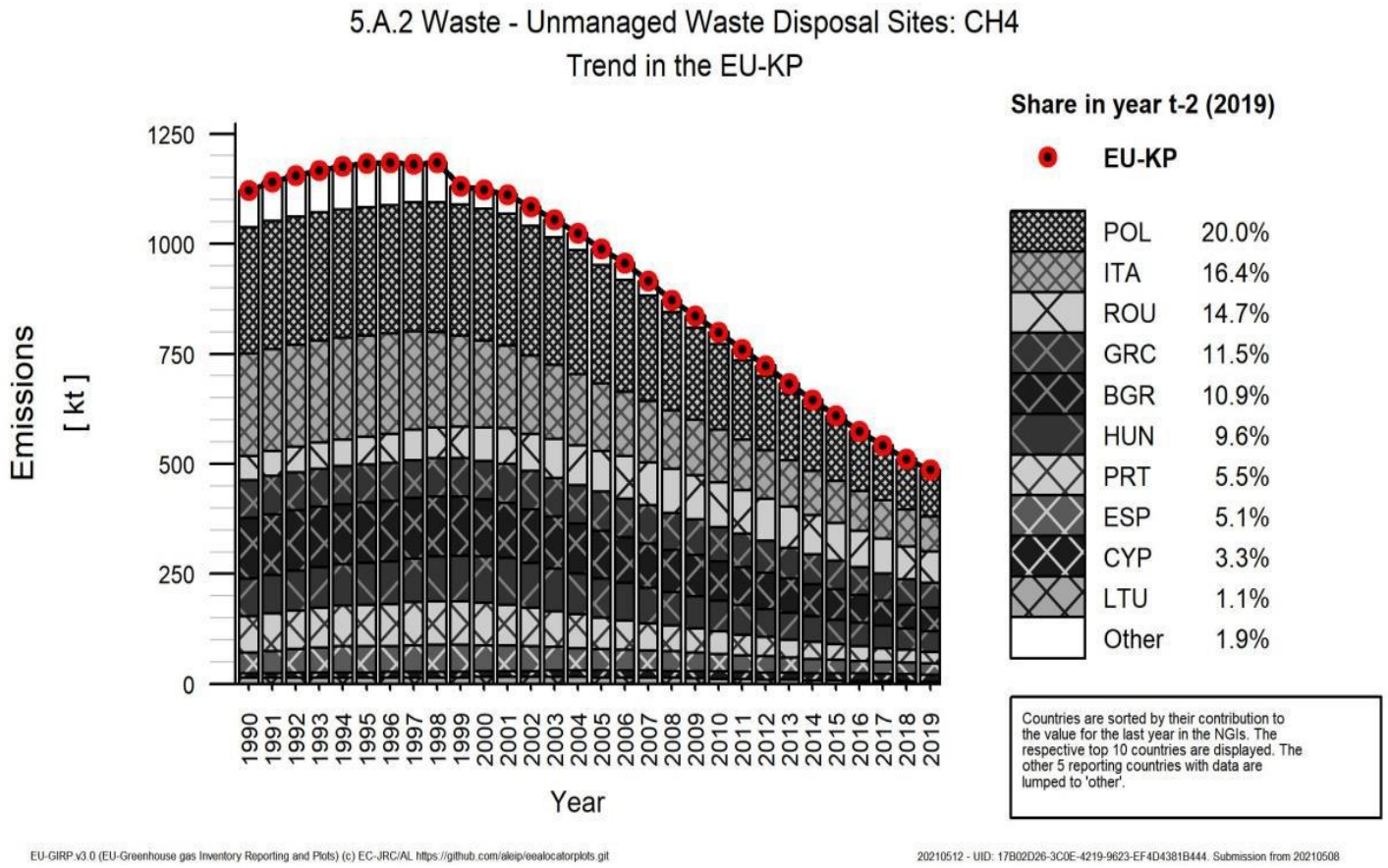
Landfill methane emissions have declined…..

Changes in landfill gas captures

- More modern landfills

Reduction in waste sent to landfills

End to open dumping (?)



Source: EEA

EU Incineration Emissions

Reported GHG Emissions are on the Rise

More MSW is being incinerated

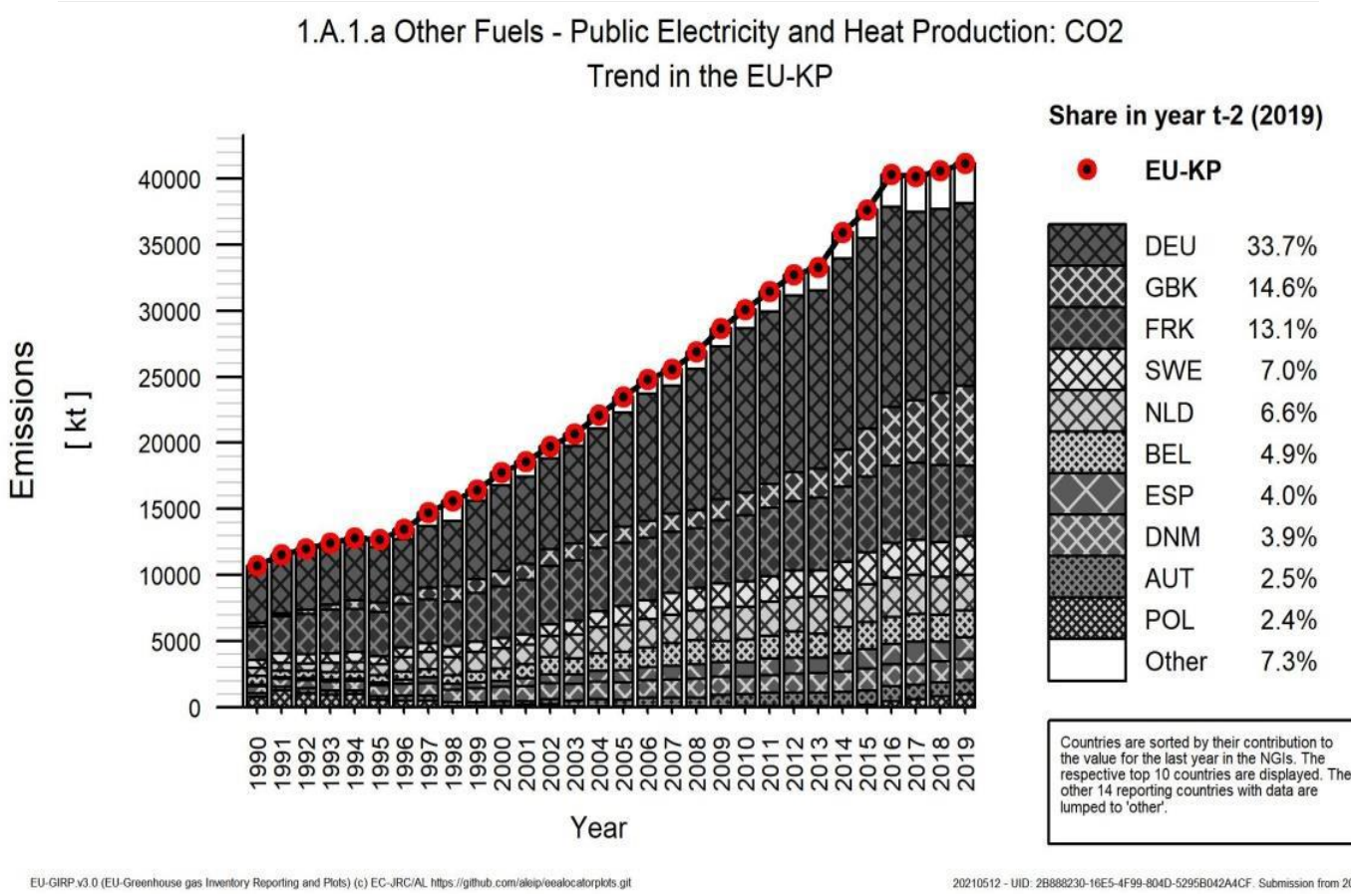
Seems likely that the fossil C content of e.g. municipal wastes is on the rise

- Plastics increasing in prominence…
- … but captures for recycling are lower than for other key materials

Member State reporting might not always reflect this

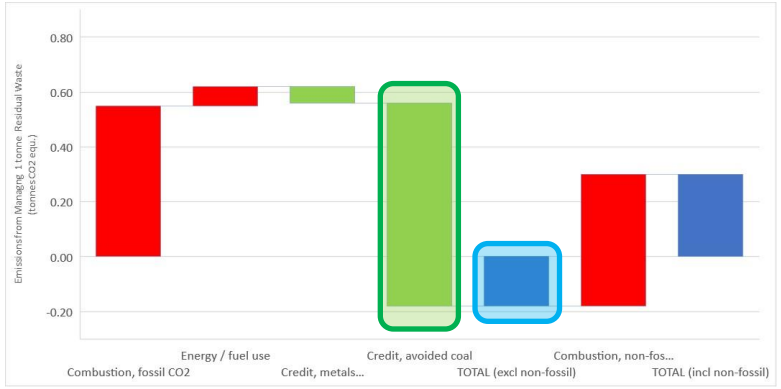
Nonetheless, an impressive increase (+300% over 30 years, or CAGR of just under 5% p.a.)

And the 30 million tonnes increase in emissions from incineration ‘eats into’ the gain on ‘managed disposal’ (circa 90 million tonnes)

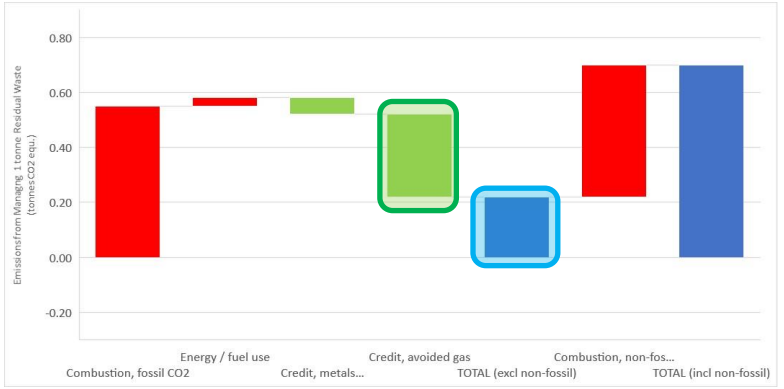


Source: EEA

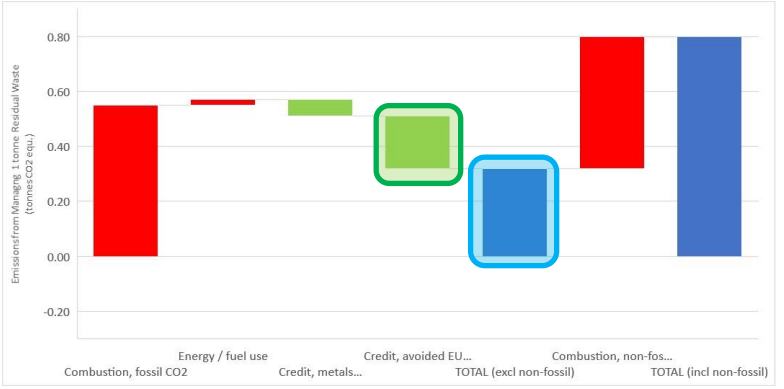
Incineration Performance – Effect of Decarbonisation



Credit as Coal



Credit as Gas



Credit as EU average (2020, est)

GHG Performance Incineration

Assumptions:

- Electricity only (note the analysis is different for heat); 25% net efficiency; residual waste after well-performing recycling

In the old days , developers of incineration projects always assumed ‘coal’ was displaced

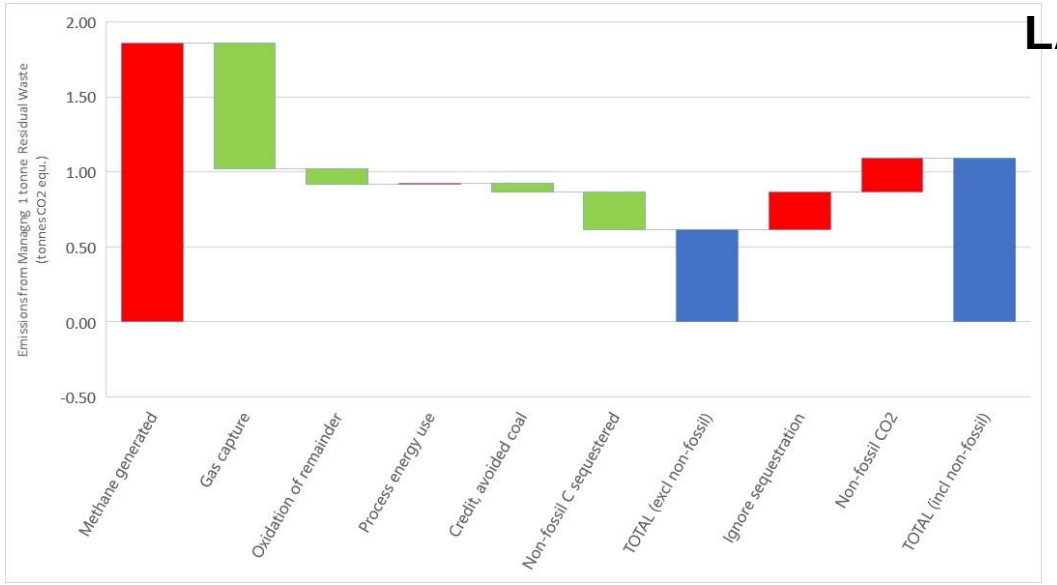
- No longer credible in EU
- What is the local effect of a new / existing facility generating power? What source is ‘being avoided’? This question usually has a “***local”*** answer

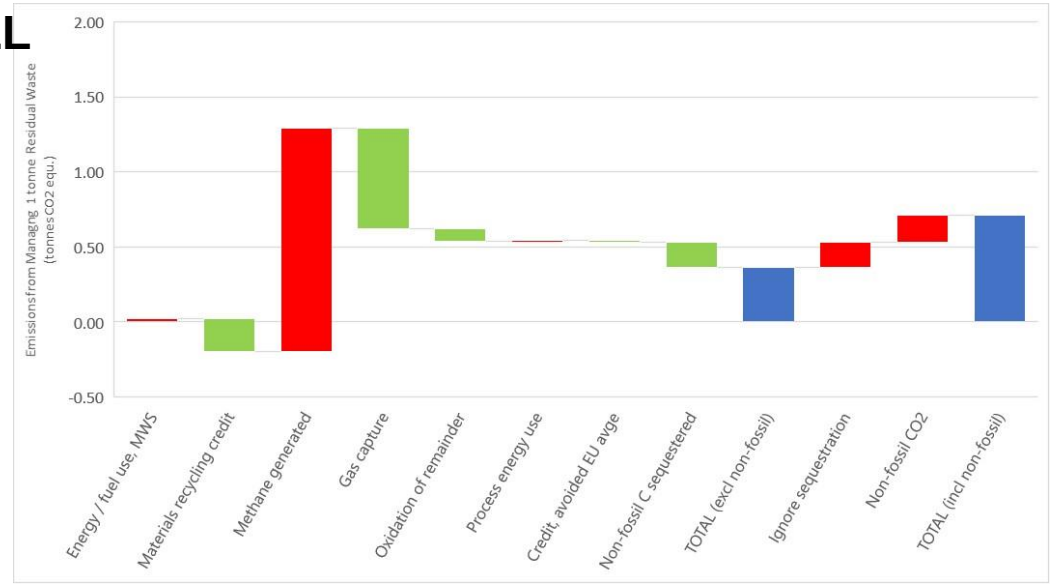
Gas may be the marginal in some countries as coal is phased out

Some use ‘grid average’ – so EU average figures shown here (17 MS already have grid average below EU average)

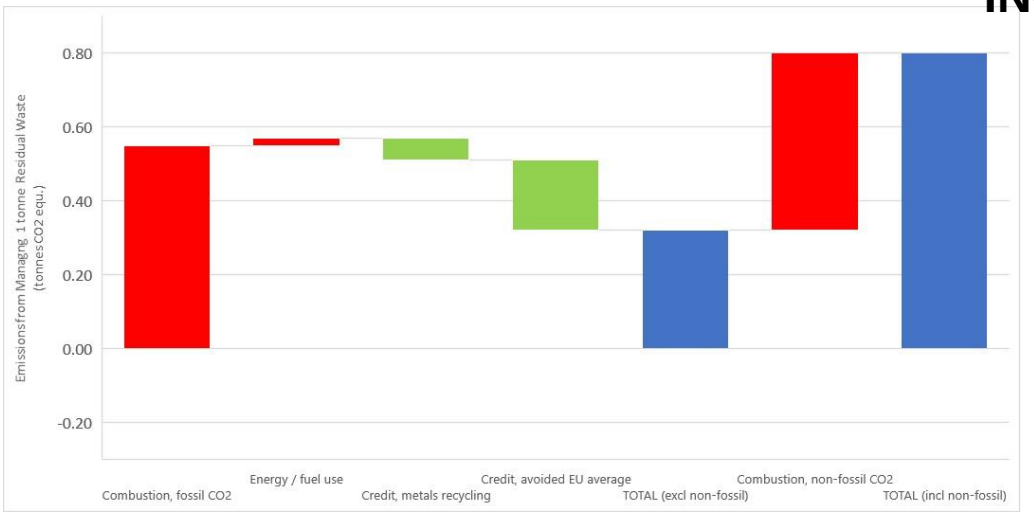
Mixed Waste Sorting (MWS) – Effect on Landfill and Incineration

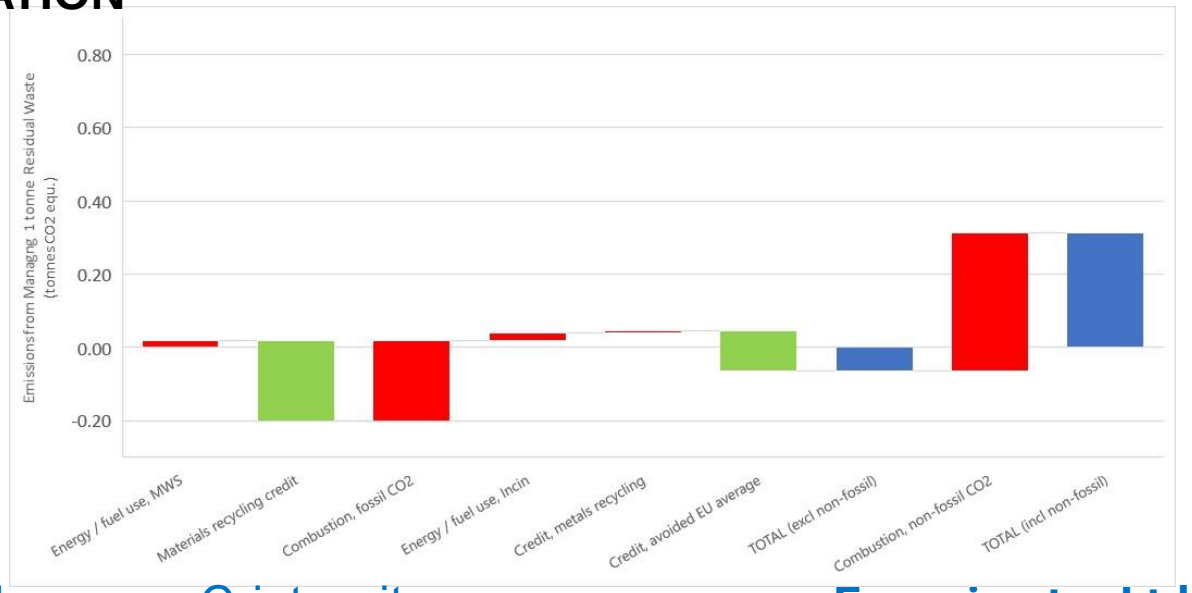
LANDFILL





INCINERATION





Source: Equanimator

All with 'avoided power' at EU average C-intensity

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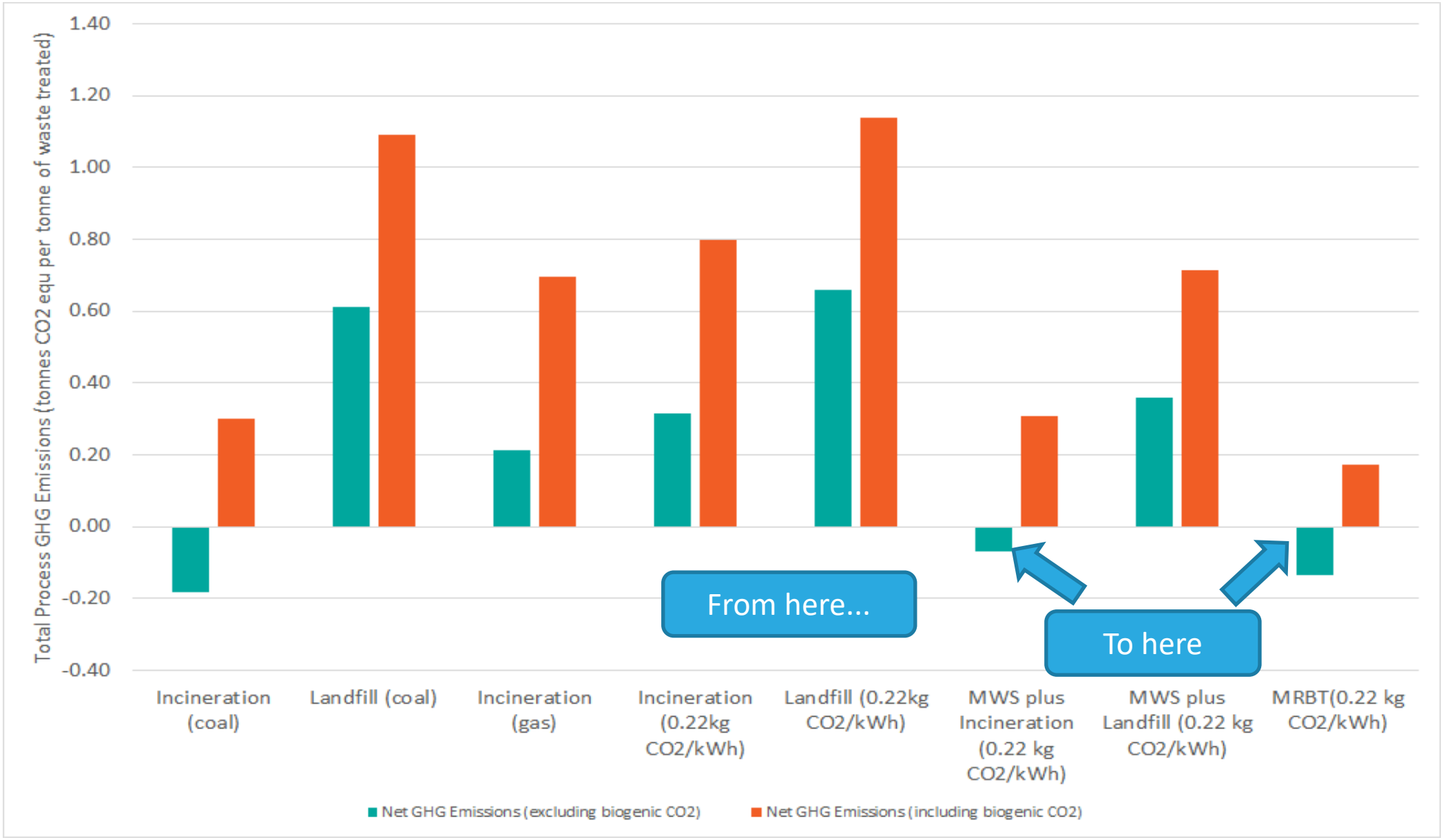
Mixed Waste Sorting (MWS) – Effect on Landfill and Incineration



Source: Zero Waste Europe

Recommendation 1

Issues

- The Landfill Directive – Article 6 – requires treatment of waste prior to landfilling
- 'Treatment' has not been well articulated
- The Malagrotta ruling is not definitive (Member State implementation varies) in its elaboration of what 'treatment' means

Recommendation 1

- **Define 'treatment of waste prior to landfilling' to include:**
  - **A minimum standard of mixed waste sorting (e.g. Art. 27 of the Waste Framework Directive). The objective is to gain environmental advantage through materials recovery**
  - **Biostabilisation of remaining waste to ensure respirometric 'attitude' of waste falls below a specified level (as had been envisaged in Biowaste Directive of 2001)**
- **Landfill Directive should also include, at Annex I, elaboration of characteristics of cover layers to enable fugitive methane emissions to be effectively minimized**

Recommendation 2

Issue

- The Landfill Directive targets at Article 5(2) – relating to the reduction in the amount of biodegradable municipal waste being landfilled – remain in place
- They are most difficult to meet in situations where municipal waste quantities have been increasing
- There has been no link (including in the attempt in the Malagrotta ruling to define ‘treatment’) between such a definition and the ‘biodegradability’ of waste
- Highlights the tension between the intent behind the definition of / requirement for ‘treatment’ and the inability of ‘treating’ waste to affect its status vis a vis Article 5(2) targets

Recommendation 2

- **Waste should be considered ‘no longer biodegradable’ for the purposes of the Article 5(2) targets where waste has been subject to ‘treatment of waste prior to landfilling’**
- **(The definition of treatment, and the General Requirements of Annex I, should reflect the objective to reduce methane emissions through the combination of stabilization, and passive oxidation through landfill cover layers)**

Recommendation 3

Issues

- (If not earlier) Ever since the publication of the study supported by DG Environment in 2000, the case for preferring incineration over landfill has been shaky
- On grounds of environmental performance alone, several studies have highlighted that the monetized environmental impacts of incineration have been worse than those for landfills
- No study (of which I am aware) has suggested that any additional benefits that may be associated with incineration are justified by the additional costs of incineration over landfill
- The waste hierarchy used to place all ‘recovery’ at the same tier
- ECJ rulings in the early 2000s indicated that incineration should be considered as ‘disposal’ where its principal function was dealing with waste and not the substitution of materials / fuels
- Nonetheless, the WFD included a new hierarchy where a) ‘material recovery’ from ‘other recovery’, and b) a formula (R1) was instated for incineration of municipal waste allowing for incineration to qualify as ‘recovery’ where the energetic performance exceeded a given threshold
- This threshold has been further amended to make it easier for the criterion to be met in warmer climates (further distancing the R1 formula from the earlier ECJ rulings)
- As energy systems decarbonize, the resources and pollution displaced by energy generation will fall

Recommendation 3 (cont.)

Issues

- Various Articles of the WFD and LD enshrine a preference for ‘other recovery’ over disposal
- The justification for the R1 criterion is ‘weak’ if not absent, since recent analyses show that a ‘landfill system’ respecting Recc 1 is likely to be superior – environmentally - to an incinerator

Recommendation 3

- **Remove the R1 formula in Annex II of the WFD so that municipal waste incineration is no longer able to be classified as ‘recovery’**

Recommendation 4

Issues

- Managing residual waste in the form described above (Recc 1) is no worse than incineration
- Stabilized wastes sent to landfill are counted within the 'quota' which the Article 5(5) targets give to Member States
- The Article 5(5) targets do not reflect the evidence (if they did, there would be broad equality of treatment between incineration following sorting (see Recc 5), and landfill following treatment)
- The evidence ***does*** support a phase out of landfilling of waste, if not treated as per Recc 1
- The 10% quota might be used for landfilling untreated waste – we should eliminate that (consistent with Article 6 of the LD when revised definition of treatment is adopted)

Recommendation 4

- **Amend the Article 5(5) target in the LFD to read as follows:**
  - **Member States shall take the necessary measures to ensure that by 2030 the amount of municipal waste *landfilled without treatment prior to landfilling, with treatment defined as per Article [X] is reduced to zero*.**
- **Art 5a(1) of the LFD, regarding measuring progress towards the target, would need to be amended accordingly (to align with the preceding target)**

Recommendation 5

Issues

- As energy systems decarbonize, the environmental ‘credit’ associated with generating energy from waste has diminished, and will fall further
- The focus will shift to direct emissions from the process
- The IED makes provision for permits to omit limit values for CO2 where installations are included under the EU-ETS
- Even though incineration is not covered by the EU-ETS, the IED and associated BREF for Incineration has nothing to say about CO_2 emissions from incineration (or possible techniques to reduce them)
- The GHG emissions of ‘leftover waste’ are (approximately) 1 tonne CO_2, half of which is fossil derived, half of which is non-fossil in origin
- Removing plastics (and other materials) from ‘leftover waste’ prior to incineration reduces emissions of fossil carbon and can retain materials in the cycle of use through recycling

Recommendation 5

- **Either through Article 44 of the EU Industrial Emissions Directive (IED), or through Article 27 of the WFD (or both), mandate the use of mixed waste sorting systems of a defined quality at the front of all new incineration plants, and those which have been operational for less than ten years**

Recommendation 6

Issues

- The Article 5(2) and Article 5(5) landfill targets, taken together, give limited incentives for waste prevention
- Along with relevant clauses in the LD and WFD, their principal effect appears to be to push waste from landfills to incineration / MBT facilities configured to deliver refuse derived fuels
- We need a target that encourages waste prevention (or above target levels of recycling)

Recommendation 6

- **Establish a target to reduce residual municipal waste to less than 175kg/inh, to be achieved on the same schedule as the existing WFD recycling targets**

Recommendation 7

Issues

- The economic incentives affecting landfill and incineration ought to be better aligned with their associated externalities
- Energy systems are increasingly affected by such measures through the EU-ETS
- Most Member States have landfill taxes, but in many cases, they are at low levels (and a small number of countries have no taxes, though some of these, e.g. Germany, have regulations in place to restrict landfilling)
- Some Member States have incineration taxes in place, usually at low levels
- Incineration's emissions are reported to the UNFCCC under 'Energy' (as Stationary Combustion) and not under the 'Waste' chapter (the analysis of 'Fit for 55' may overlook this)
- Yet although Energy generation is included under the EU-ETS (and power generators have had free allowances withdrawn), incinerators escape
- Also note again that IED makes provision for excluding CO_2 emissions from permits where installations are not under the EU-ETS, it (BREF) has nothing to say about CO_2 from incineration

Recommendation 7

- **Include incineration facilities within the EU Emissions Trading System (ETS)**

Recommendation 8

Issues

- The economic incentives affecting landfill and incineration ought to be better aligned with their associated externalities
- Most Member States have landfill taxes, but in many cases, they are at low levels (and a small number of countries have no taxes, though some of these, e.g. Germany, have regulations in place to restrict landfilling)

Recommendation 8

- **Require Member States to differentiate tax rates for landfilling of:**
    - **Waste that contained biodegradable waste, including municipal waste, but which has been subject to the treatment referred to above (lower rate); and**
    - **Waste that contained biodegradable waste, including municipal waste, but which has not been treated in line with the definition of treatment (upper rate).**

Set a minimum differential (circa €75/tonne) to drive change

(note – could also include landfills once measurement issues are resolved)

Outcomes

Key results

- Reduce CO_2 emissions (circa 50 million tonnes benefit in 2035 relative to counterfactual)
- Signal that residual waste is being reduced over and above what is implied by recycling targets
- Reduce likelihood of lock-in to less flexible solutions in countries still at early stages
- Consistency with Green Deal and circular economy objectives