

The benefits of including municipal waste incinerators in the Emissions Trading System

Policy Briefing - April 2021



Summary

To ensure the EU is having a neutral impact on climate change by 2050, the European Commission is currently reviewing all relevant EU policies, including the Emissions Trading System¹ (ETS), and proposing extending the ETS to new sectors of the economy.

Although emissions from waste incineration are already included in the ETS, municipal solid waste (MSW) incineration plants are currently exempted. This leaves a vast majority of waste incineration plants (500+) with no obligation to address their adverse climate change impact.

MSW incinerators emit large amounts of CO₂ – over 95 million tonnes just in 2018.² Furthermore, the electricity produced by MSW plants is more carbon-intensive (around 504 gCO_{2e}/kWh)³ than electricity generated through the conventional use of fossil fuels such as gas; and, most importantly, it is twice the carbon intensity of the EU marginal electricity grid average.⁴

The voluntary inclusion of MSW incinerators under ETS Article 24 is not working properly: to date, only Denmark and Sweden have included MSW incinerators under the ETS.

This revision is a crucial opportunity to subject this carbon-intensive industry to the “polluter pays” principle by pricing in the carbon cost of burning waste to progressively reduce emissions from the sector.

The inclusion would also encourage other more sustainable and low-carbon waste treatment options, and help improve local air quality.

To this end, Zero Waste Europe calls on the European Commission to:

- Include municipal solid waste incinerators in EU ETS;
- End free allocation of emission allowances to all types of waste incineration, including co-incineration;
- Exclude novel accounting principles taking into account ‘avoided emissions’ from the EU ETS; and
- Remove the wording from Annex IV that sets an emission factor of zero for biogenic material.

¹ eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32003L0087

² zerowasteurope.eu/wp-content/uploads/2020/11/Landfill-emission-reductions-only-tell-half-the-story-as-GHG-emissions-from-waste-to-energy-incineration-double.pdf

³ This refers to the fossil carbon intensity of electricity generated.

⁴ Greenhouse gas emission intensity (g CO_{2e}/kWh) is calculated as the ratio of CO_{2e} emissions from public electricity production (as a share of CO₂ equivalent emissions from public electricity and heat production related to electricity production), and gross electricity production.

The climate change impact of MSW incineration

The Commission is currently reviewing the Emissions Trading System (ETS), and will propose a reform in June 2021, which will include the possibility of extending the scope of emissions trading to new sectors – including municipal solid waste (MSW) incineration.

Emissions from waste incineration are already included in the ETS Directive, except for municipal waste. Voluntary inclusion of MSW incinerators is not working properly: to date, only two countries (Denmark⁵ and Sweden⁶) have voluntarily included those facilities in the scope.

MSW incinerators emit large amounts of CO₂ – 95,425kt just in 2018.⁷ Around 52,102kt of this CO₂ was emitted through the incineration of fossil-based materials such as plastic.⁸ This is equivalent to the emissions of 13.4 coal-fired power plants.⁹

As MSW incinerators are not part of ETS, the 52,102kt of fossil CO₂ released by EU incinerators is estimated to have resulted in an unpaid cost to society of around €1,3 billion in 2018 alone.¹⁰

There are currently over 500 MSW incinerators in Europe with many more under construction or in planning, which means that CO₂ emissions from the sector will continue to grow in the near future.

Moreover, the electricity produced by MSW plants is more carbon-intensive (504 gCO_{2e}/kWh)¹¹ than electricity generated through the conventional use of fossil fuels such as gas.¹² Moreover, it is twice the carbon intensity of the EU marginal electricity grid average (249 gCO_{2e}/kWh).¹³ While the electricity grid should be decarbonising as a result of more renewable energy sources coming online, electricity produced at the incinerator will become a major climate issue.

⁵ www.oecd-ilibrary.org/sites/d1eaaba4-en/index.html?itemId=/content/component/d1eaaba4-en

⁶ www.regeringskansliet.se/48f977/contentassets/396b53f0fe8146b7be13c05d5e792059/avfall-sverige.pdf

⁷ This includes only CO₂ emissions

zerowasteurope.eu/wp-content/uploads/2020/11/Landfill-emission-reductions-only-tell-half-the-story-as-GHG-emissions-from-waste-to-energy-incineration-double.pdf

⁸ Plastic is derived from crude oil and the carbon is released when burnt.

⁹ www.epa.gov/energy/greenhouse-gas-equivalencies-calculator

¹⁰ The current cost of CO₂ is €25.15 / tonne. <https://markets.businessinsider.com/commodities/co2-european-emission-allowances>

¹¹ www.eunomia.co.uk/reports-tools/greenhouse-gas-and-air-quality-impacts-of-incineration-and-landfill

¹² A typical combined-cycle gas turbine power plant produces electricity with a carbon intensity of around 340gCO_{2e}/kWh. The carbon intensity of incineration is 504g CO_{2e}/kWh – thus much more than that of gas.

www.eea.europa.eu/data-and-maps/daviz/co2-emission-intensity-6#tab-googlechartid_googlechartid_googlechartid_googlechartid_chart_11111

¹³ According to the EEA early estimates, the EU's GHG emission intensity of electricity generation continued to decrease also in 2019, reaching 249 gCO_{2e}/kWh. This means that, on average, the equivalent of 249 grams of CO₂ is released for every kilowatt hour of electricity generated.

www.eea.europa.eu/data-and-maps/indicators/overview-of-the-electricity-production-3/assessment

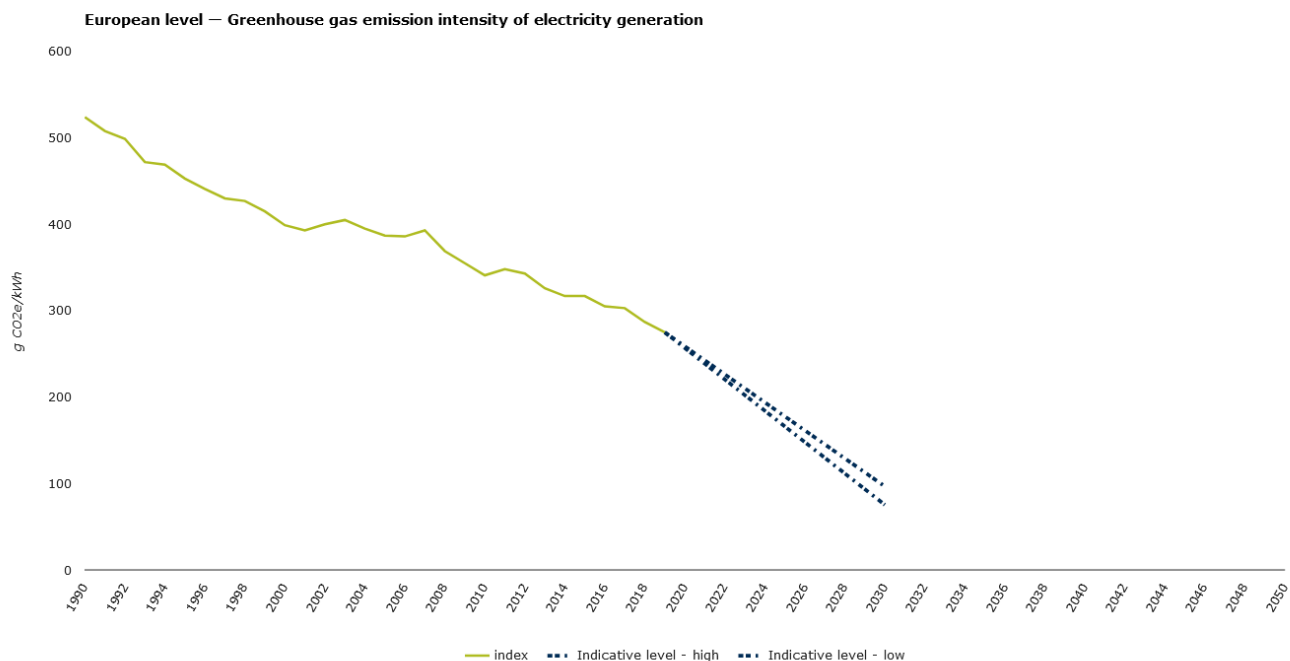


Figure 1: Greenhouse gas emission intensity of electricity generation in Europe.
Source: Greenhouse gas emission intensity of electricity generation.¹⁴ European Environment Agency.

To prevent the lock-in in (fossil) emissions from MSW incinerators, there is a real need to ‘price in’ the carbon cost of burning (fossil) waste to progressively reduce emissions from this carbon-intensive industry in line with the EU’s net-zero emissions goal by 2050.

Additional benefits of the inclusion of MSW within the EU ETS

Besides its positive impact in terms of climate change, the inclusion of MSW within the EU ETS would bring in several other environmental benefits.

First of all, the inclusion would help to correct the unfair competition with other energy producers, especially those using renewable sources such as wind and solar energy. Since burning waste results in much higher CO₂ emissions (0.7-1.2 tons of CO₂ per tonne of MSW)¹⁵ than from renewables, increasing the cost of waste incineration would also help the transition to less carbon-intensive power generation infrastructure.

Secondly, a higher cost of MSW incineration would also encourage better and more climate-friendly waste management methods – such as improving separate collection and sorting as well as recycling, and incentivising waste providers to decrease the share of waste sent to incineration. This can contribute to minimising residual waste generation, which is – and must be kept as – the top priority. This would also go hand-in-hand with the move towards greater Extended Producer Responsibility. A higher price for incineration would provide a market signal to those producing non-recyclable and hard-to-recycle products, as they would be paying more of the climate change costs of their design decisions.

¹⁴ Greenhouse gas emission intensity of electricity generation in Europe.

www.eea.europa.eu/data-and-maps/indicators/overview-of-the-electricity-production-3/assessment

¹⁵ IPCC Good Practice Guidance & Uncertainty Management in National Greenhouse Gas Inventories.

www.ipcc-nggip.iges.or.jp/public/gp/bgp/5_3_Waste_Incineration.pdf

In addition, including MSW within the EU ETS would also incentivise waste providers to further recover materials from the residual waste stream, especially if the higher costs could be allocated towards them. Composition analysis of residual waste indicates that the largest share of what is currently used as incinerator feedstock could be recycled or composted.¹⁶ For example, in Germany, despite having separate collection systems for organic waste since 2015, 39 percent of the content of residual waste bins still consists of organic waste.¹⁷ Recovering those materials for circular economy purposes would result in carbon savings¹⁸ and, thus, eventually contribute to a reduction in the amount of disposed waste. For instance, some plant operators (e.g. the Romerike Avfallsforedling IKS plant in Norway)¹⁹ have already started carrying out front-end removal of plastics and other materials for recycling purposes.

Higher incineration costs would also create an enabling policy framework for low-carbon, non-combustion alternatives for managing residuals – such as material recovery and biological treatment²⁰ facilities. These facilities are climate-friendly as they recover fossil-based materials for recycling purposes whilst stabilising the organics²¹. This is of particular importance given the ongoing decarbonisation of the EU economy and energy production, which implies the need to reduce GHG emissions progressively and steadily to achieve net-zero by 2050.

Furthermore, by minimising waste incineration, we would also contribute to improving local air quality.²² Due to increasing quantities of waste sent to incineration, incinerators will emit more toxins and pollutants. The incineration of (processed or raw) waste also produces considerable quantities of harmful solid residues – i.e. waste incineration slag (ash), filter dust and residues from flue gas cleaning – which not only contain heavy metals, but also organic pollutants that have not been completely destroyed during incineration or have reformed due to synthesis processes.²³ These residues represent a burden for the environment and are costly to dispose of.²⁴

Other considerations

End free allowances

Including municipal waste incinerators in the ETS without further reforming the overall trading scheme will not be sufficient. There is currently a large surplus of European Union Allowances (EUA) in the ETS, which undermines the stringency and decarbonisation incentive of the ETS cap.²⁵ If incinerators are added without wider structural reforms, they will just be able to rely on part of this surplus, and the impact on reducing incineration emissions will be less than what's desired. While polluting is always a bad thing, polluting during a climate crisis is unacceptable, and the ETS should mandate full auctioning of emissions allowances.

¹⁶ For example, Environmental concerns in Cohesion Policy Funds (ERDF, ESF, CF) publications.europa.eu/en/publication-detail/-/publication/73061c4e-7aaa-11e9-9f05-01aa75ed71a1

¹⁷ Federal Environment Agency (2020): Comparative analyses of municipal waste in Germany www.umweltbundesamt.de/publikationen/vergleichende-analyse-von-siedlungsrestabfaellen

¹⁸ According to a study by the Institute for Applied Ecology, 740.000 tons of CO₂ could be saved every year in Germany if the organic waste would be collected and recycled properly (cascade use).

www.oeko.de/publikationen/p-details/kapazitaeten-der-energetischen-verwertung-von-abfaellen-in-deutschland-und-ihre-zukuenftige-entwicklung

¹⁹ The world's first fully automated sorting plant for MSW. <https://www.tomra.com/en/sorting/recycling/case-studies/roaf>

²⁰ Building a bridge strategy for residual waste. Material Recovery and Biological Treatment to manage residual waste within a circular economy. zerowasteurope.eu/library/building-a-bridge-strategy-for-residual-waste

²¹ NB: This particular statement represents solely the opinion of Zero Waste Europe and not the position of Deutsche Umwelthilfe (Environmental Action Germany).

²² Greenhouse Gas and Air Quality Impacts of Incineration and Landfill.

www.clientearth.org/latest/documents/greenhouse-gas-and-air-quality-impacts-of-incineration-and-landfill

²³ Toxic Ash Poisons our Food Chain. ipen.org/sites/default/files/documents/ipen-toxic-fly-ash-in-food-v1_4a-en-web.pdf

²⁴ See eg The hidden impacts of incineration residues.

zerowasteurope.eu/wp-content/uploads/2019/11/zero_waste_europe_cs_the-hidden-impacts-of-incineration-residues_en.pdf

²⁵ Since 2008, over 200 billion euros worth of free emission allowances have been handed out to heavy industry and the aviation sector under the EU ETS. Phase-out 2020: monitoring Europe's fossil fuels subsidies. odi.org/en/publications/phase-out-2020-monitoring-europes-fossil-fuel-subsidies

To ensure effective reduction of emissions, the inclusion of MSW in the EU ETS also requires wider structural reforms²⁶ to substantially reduce the EUA surplus. These must be combined with a strengthened cap to provide adequate decarbonisation incentives to waste management and other sectors.

Avoiding “Avoided Emissions”

Finally, it's of utmost importance to ensure that the accounting of CO₂ and equivalents under the scheme is properly and correctly carried, otherwise the decarbonisation effect of ETS will be undermined.

The revision must not allow for creative CO₂ accounting methods such as ‘avoided emissions’. ‘Avoided emissions’ is an arbitrary accounting concept where one product or activity is claimed to avoid GHG emissions elsewhere in the economy, with the assumption that those ‘avoided’ emissions should be discounted from the production emissions of said product or activity²⁷. For example, some stakeholders claim that waste incineration is a way to reduce CO_{2e} emissions from the waste sector and, in particular, from landfilling. While the GHG emissions from landfills (and therefore the waste sector overall) are seemingly reducing, the actual emissions from waste activities are shifting to the energy sector as more waste is being incinerated in MSW incinerators across Europe. Since GHG emissions from WTE plants are not reported under the waste sector but the energy sector, it gives the false impression that the waste sector is reducing its overall emissions, hiding important climate emissions and pushing waste policy in a troubling direction (see Figure 2).

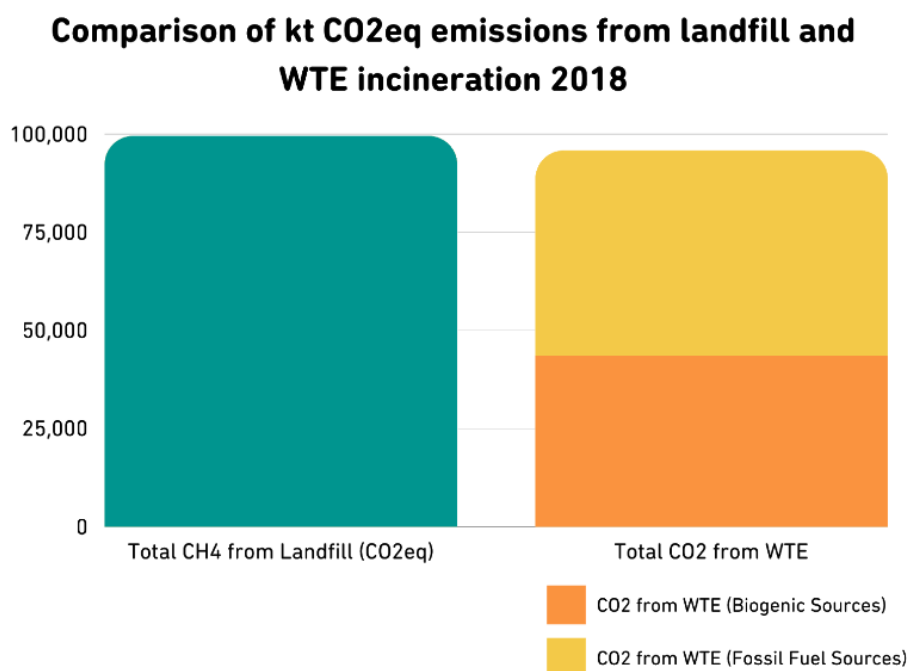


Figure 2. Comparison of ktCO₂ emissions from Landfill and WTE Incineration Source: Landfill emission reductions only tell half the story as GHG emissions from Waste-to-Energy incineration double.²⁸ Zero Waste Europe (2021).

²⁶ See further recommendations beyond the inclusion on MSW incinerators here.

carbonmarketwatch.org/wp-content/uploads/2021/02/Response-to-EC-public-consultation-on-updating-the-EU-ETS.pdf

²⁷ CO₂ Avoidance in the EU ETS - Keeping business as usual.

network.bellona.org/content/uploads/sites/3/2019/11/Bellona_CO2-AVOIDANCE-IN-THE-EU-ETS_KEEPING-BUSINESS-AS-USUAL_10_2019.pdf

²⁸ zerowasteurope.eu/library/landfill-emission-reductions-only-tell-half-the-story-as-ghg-emissions-from-waste-to-energy-incineration-double

This lack of causality creates a strong risk of various industries and activities “piggybacking” on each others’ emission reduction accounting without actually reducing them.²⁹ As such, climate impact assessment of activities should take into consideration the actual life cycle emissions, rather than providing climate credits and allowances for emissions claimed to be avoided as a result of that activity. Avoided emissions should not be used to change the emission factors in the EU ETS, nor to change the concept of when the CO₂ is emitted.³⁰

The principle of not using ‘avoided emissions’ in GHG accounting should apply to all activities, especially when determining allowances.

Furthermore, we would like to point out that it is essential to avoid setting an emission factor of zero for combustion of biogenic materials. The incineration of biowaste must not be compared to regenerative energy production. Valuable compost and biogas can be produced from high-quality recycled biowaste, representing a high CO₂ saving potential.³¹

²⁹ In a recent report, the European Court of Auditors found that free allocation of allowances to industry could slow decarbonisation, and needs better targeting.

³⁰ As is described in e.g. the CO₂ storage Directive.

³¹ The Potential Contribution of Waste Management to a Low Carbon Economy.

zerowasteeurope.eu/library/the-potential-contribution-of-waste-management-to-a-low-carbon-economy

Conclusion and recommendations

MSW incinerators are used to burn growing amounts of waste in Europe. The EU ETS does not currently cover emissions from these incinerators, although they are highly emitting plants and their emissions doubled between 1990–2018, reaching 95,425kt of CO₂ (fossil and biogenic).

The revision of the EU ETS Directive should bring MSW incinerators into the EU carbon market. This would subject MSW incineration to the carbon price signal, making this practice more expensive and encouraging less carbon-intensive waste treatment options. This inclusion would also encourage more material recovery and better waste management in general, and help improve local air quality.

For this to be effective, the EU ETS Directive should also have a wider structural reform and exclude free emissions allowances, as well as any attempt to include novel accounting principles – such as ‘avoided emissions’ – that would undermine the climate action in this sector.

To this end, Zero Waste Europe recommends to:

- Add MSW incineration plants to Annex I of the EU ETS Directive;
- End free allocation of emission allowances by 2023;
- The exclusion of new accounting principles based on ‘avoided emissions’ from the EU ETS Directive; and
- Delete the wording “The emission factor for biomass shall be zero” from Annex IV.

Author(s): Janek Vähk, Elena Schägg
Editor(s): Ana Oliveira, Joan Marc Simon, Pierre Condamine
Zero Waste Europe, April 2021



Zero Waste Europe is the European network of communities, local leaders, experts, and change agents working towards the elimination of waste in our society. We advocate for sustainable systems and the redesign of our relationship with resources, to accelerate a just transition towards zero waste for the benefit of people and planet.



Environmental Action Germany (DUH) has been campaigning to preserve the natural foundations of life for more than 40 years. In doing so, it brings together protecting the environment with consumer protection like no other organisation in Germany.



Zero Waste Europe gratefully acknowledges financial assistance from the European Union. The sole responsibility for the content of this event materials lies with Zero Waste Europe. It does not necessarily reflect the opinion of the funder mentioned above. The funder cannot be held responsible for any use that may be made of the information contained therein.