Waste-to-energy: How Europe can avoid sleepwalking into a landfill catastrophe and achieve net zero

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Emily Warrender September 30, 2025

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Vanessa Fakra at Kanadevia Inova AG discusses waste-to-energy, including how Europe can avoid sleepwalking into a landfill catastrophe while achieving net zero

The European Union (EU) has ambitious landfill reduction targets of 10% or less by 2035. On the other hand, the European Commission is currently assessing the inclusion of the Waste to Energy and or the whole waste sector in the EU Emissions Trading System (ETS). This move could be counterproductive, as it penalizes technologies such as Waste to Energy (WtE) that are crucial for achieving net-zero goals.

A silent but massive climate threat

Waste from food and other rubbish currently accounts for around 10% of all global greenhouse gas emissions – more than five times higher than the entire aviation industry. The main culprit is methane, released as food, paper, and other natural materials decompose in landfills without oxygen.

Methane is a strong Greenhouse Gas (GHG). It traps 81 times more heat than CO_2 over 20 years, and 28 times more over 100 years. Scientists estimate that methane emissions are responsible for roughly one-third of today's global heating, making the gas one of the fastest accelerators of the climate crisis – if left unchecked.

The problem is set to worsen. Without intervention, emissions from unmanaged landfills could double by 2050, driven by rising populations and wealth.

Super-emitters in Europe

While poor waste management is often associated with emerging economies, "super-emitter" methane leaks from landfills are increasingly being detected by satellites in regions like Europe and the U.S. A striking example is Madrid, where researchers, using satellite data analysis and ground-based surveys, detected continuous methane leaks from landfills south of the city between 2021 and mid-2023. The largest of these leaks was measured at a single point in time to be emitting 25 tonnes of methane an hour – the CO_2 equivalent of 3.9 million cars running for a year.

This case underscores a critical point: landfills remain a silent but powerful driver of climate change.

Kanadevia Inova: Turning waste into climate action

In response to this urgent challenge, Kanadevia Inova, a global green-tech leader, is spearheading circular economy solutions. Our mission is to build a world "free of wasted waste."

The company specialises in Waste to Energy (WtE) and renewable gas (RG) technologies that transform non-recyclable waste and biogenic residues into valuable resources. With over 1,600 reference projects worldwide, Kanadevia Inova covers not only engineering and operations but also long-term service, ensuring plants remain efficient and future-ready.

At the heart of their work is the thermal treatment of waste – a process that:

- Reduces landfill volumes and prevents methane leaks.
- Recovers valuable resources from waste, such as metals that cannot otherwise be recycled.
- Provides renewable energy to local communities, enhancing energy security.

Beyond waste reduction: The role of carbon capture

Modern Waste to Energy is a highly regulated industry under the EU Industrial Emissions Directive. Plants must meet strict environmental standards – and many are now going even further by integrating Carbon Capture Utilization and Storage (CCUS). CCUS allows operators to capture the CO2 released during thermal treatment and either store it underground or use it to produce e-fuels or for industrial applications. This technology can enable negative emissions, making WtE a net remover of greenhouse gases. Furthermore, co-location of e-fuels production, which is an exothermic process, with Carbon Capture, which requires energy, can optimize the overall energy efficiency of CCUS, while improving energy security.

Kanadevia Inova is expanding its capabilities in providing Carbon Capture plants for downstream WtE facilities. The company has validated its physical modeling through successful pilot plant testing. With the development of its first EPC (Engineering, Procurement, and Construction) projects progressing well, Kanadevia Inova anticipates announcing the successful closure of new contracts soon.

Policy crossroads: A risk to climate progress

Despite its benefits, WtE faces a major policy challenge. The EU is considering extending the ETS to include WtE plants. If enacted, operators would be forced to purchase carbon permits for the waste they thermally treat – driving up costs and potentially rendering many facilities uncompetitive.

The unintended consequence?

A shift back to landfilling, leading to an immediate surge in methane emissions, undoing years of progress toward climate goals. The approach fails to recognise the circular benefits of WtE, such as hygienisation of waste, energy recovery, metal recovery, ash reuse in construction, and CCS integration.

By penalising WtE, policymakers risk undermining Europe’s 2035 landfill reduction target.

A smarter policy path forward

To align climate ambition with reality, Kanadevia Inova and other industry leaders recommend a more balanced framework:

1. Exclude the waste sector from the ETS and develop a dedicated decarbonisation pathway that focuses on two key pillars: methane emission reductions and the development of the recycling sector, along with the upstream layers of the waste hierarchy (reduce and reuse).
2. Prioritise landfill methane eradication – The EU should pursue its 2035 landfill reduction target by banning organic waste from landfills, enforcing strict methane capture and monitoring at existing sites, and applying strong financial penalties to countries that fail to comply.

3. Acknowledge WtE's role and support its potential – Policy must recognise that WtE is a necessary partner, handling the non-recyclable fraction of waste.

Waste to Energy as a partner, not a competitor

WtE is not a replacement for recycling. Instead, it is a necessary partner – managing the non-recyclable fraction of waste, reducing landfill dependency, and supporting circularity by recovering resources that would otherwise be lost.

By integrating WtE with recycling and waste reduction strategies, the EU can:

- Cut methane emissions dramatically.
- Enhance energy independence.
- Advance toward net-zero climate goals.

WtE is not an alternative to recycling but an essential complement. It prevents methane leaks, supplies clean energy, and enables resource recovery. Including WtE in the ETS risks reversing progress and worsening the landfill crisis. For Europe to achieve its 2035 targets and advance toward net zero, policymakers must support WtE as part of an integrated circular economy.

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