ESWET response to the EU Commission on permanent CCU consultation

ESWET reply to the EU Commission consultation on the draft Delegated Act supplementing the EU Emission Trading System Directive concerning the requirements for considering that GHG emissions have become permanently chemically bound in a product

ESWET – the European Suppliers of Waste to Energy Technology represents companies that have built and supplied over 95% of the Waste-to-Energy (waste incineration with energy recovery, or WtE) plants in operation in Europe.

The association seeks to promote the technology which, within the framework of the Waste Hierarchy, recovers energy from waste that would otherwise end up in landfills.

Carbon capture unit at the AVR Duiven plant.
Credits: AVR.

The role of Waste-to-Energy in Carbon Capture (CC)

Given Waste-to-Energy's proposed inclusion in the upcoming EU Emission Trading System, the potential for Carbon Capture and Utilisation (CCU) to be recognised under this will have a significant impact on the business case for future CCU projects in the Waste-to-Energy (WtE) sector.

As a hard-to-abate industry with a **capture potential of 60-70 million tonnes of CO_2** per year in Europe alone as per the UN Intergovernmental Panel on Climate Change IPCC[1], ESWET welcomes this Delegated Act given the centrality of carbon capture to the sector.

WtE is ideal for carbon capture as approximately **58% of its emissions are biogenic[2]**, giving huge potential for **negative emissions**. This makes WtE the sector with the second-largest potential for capturing biogenic emissions in Europe[3].

Treating products that are at "end-of-life" stage means that there are no sustainability issues which may occur with the sourcing of other forms of bioenergy, where crops are grown specifically for energy production. WtE is a more financially secure means of carbon capture, given that plants are paid to treat waste so the energy penalty is not as significant to the business case [4].

[1] UN Intergovernmental Panel on Climate Change (IPCC), (2022). AR6 WGIII, Mitigation of Climate Change.
[2] Giouse, F., Ravache, E. & Moutte, L., (2020). Détermination des contenus biogène et fossile des ordures ménagères résiduelles et d'un CSR. [ADEME - Cabinet Merlin – ENVEA. Détermination Des Contenus Biogène Et Fossile Des Ordures Ménagères Résiduelles Et D'un Csr, A Partir D'une Analyse 14c Du Co2 Des Gaz De Post-Combustion. Programme UIOM 14C – Campagne de mesures sur UIOM et chaufferie CSR.] Available at: https://librairie.ademe.fr/energies-renouvelables-reseaux-et-stockage/4007-determination-des-contenus-biogene-et-fossile-des-ordures-menageres-residuelles-et-d-un-csr-a-partir-d-une-analyse-14c-du-co2-des-gaz-de-post-combustion.html Accessed on: 25/07/24;
[3] Rosa, L., Sanchez, D. L., & Mazzotti, M. (2021). Assessment of carbon dioxide removal potential via BECCS in a carbon-neutral Europe. Energy & Environmental Science, 14(5), 3086-3097.
[4] Sani, L. (2024). Curb your Enthusiasm: Bridging the gap between the UK's CCUS targets and reality. Carbon Tracker.

Examples of successful Carbon Capture in WtE Plants

The synergies of carbon capture and WtE are proven. The AVR Duiven WtE plant in the Netherlands has a capture capacity of 100,000 tonnes CO_2 per year, with the carbon being used in local horticulture [5]. Also in the Netherlands, the Twence facility will soon be capturing up to 100,000 tonnes CO_2 per year, while the Klemestrud WtE plant in Norway has a planned installation to capture 400,000 tonnes of CO_2 per year[6].

Recognition and limitations of mineralisation in the draft Delegated Act

Due to the rapidly expanding carbon capture capacities of WtE plants, we appreciate the certainty that this Delegated Act provides in incentivising CCU projects.

We welcome the prioritisation of mineralisation in Article 3.1(a) given its ability to permanently store CO_2, although worry that **the term “construction product” is narrow**, given that products which are not strictly for “construction” may also permanently store carbon e.g., remediation materials which may be used for pollutant removal.

Additionally, in the future we would like to see a **specific framework for non-permanent CCU in hard-to-abate sectors such as WtE**, which would incentivise CCU in industries which have no simple means of abatement rather than risking “lock-in” of industries which have alternatives.

[5] Ros, J., Veronezi Figueiredo, R., Srivastava, T., Huizinga, A., van Os, P., Wassenaar, H., & Garcia Moretz-Sohn Monteiro, J. (2022). Results of the 2020 and 2021 campaigns of the commercial carbon capture plant at AVR Duiven. In Proceedings of the 16th Greenhouse Gas Control Technologies Conference (GHGT-16) (pp. 23-24).
[6] Aker Carbon Capture (2023). Aker Carbon Capture awarded feasibility study by waste-to energy player in Switzerland. Available at: https://akercarboncapture.com/?cision_id=651C8691C32227C8, accessed on: 25/07/24

The carbon sequestration potential of Incineration Bottom Ash (IBA)

The potential of Incineration Bottom Ash (IBA) to sequester CO_2 through carbonation is a promising development in the waste management sector, with a potential to help the EU reach its climate goals.

IBA, which constitutes the incombustible residual part of incinerated waste, undergoes a maturation process wherein it is exposed to air and rain. This exposure stabilises the ash through a set of physico-chemical reactions, primarily carbonation, where lime (CaO) in the ash reacts with atmospheric CO_2 to form calcium carbonate ($CaCO_3$).

The CO_2 uptake potential for IBA is indicated by maximum weight gains upon carbonation, which range from approximately 3% to 6.5% by dry weight.[7] This means for every tonne of bottom ash, around 30 to 65 kg of CO_2 can be sequestered. This method not only aids in CO_2 reduction but also enhances the stability of the ash, making it suitable for use in construction applications.

IBA can be used as a substitute for natural aggregates in road construction and as a component in concrete production. Its mineral content, primarily comprising silicates and oxides, makes it suitable for these purposes, providing an environmentally friendly alternative to virgin materials and contributing to circular economy practices.[8]

Given the significant potential for CO_2 reduction of this process and the fact that carbonated IBA can be used for "construction" purposes, we ask the European Commission to add it in the current Delegated Act and its Annex.

Moreover, we propose that the Commission develops an appropriate methodology that ensures accurate tracking and reporting of CO_2 absorption in IBA.

[7] Costa, G., Baciocchi, R., Polettini, A., Pomi, R., Hills, C. D., & Carey, P. J. (2007). Current status and perspectives of accelerated carbonation processes on municipal waste combustion residues. Environmental monitoring and assessment, 135, 55-75.
[8] ESWET, (2023). IRF Report. Available at: https://eswet.eu/wp-content/uploads/2023/09/ESWET_IRF-Report_Print_2.0.pdf.

Need for proper accounting of CO2 emissions

With regards to Article 3.1(b), it must be taken into account that predicting the end-of-life treatment of a product is difficult. Furthermore, in the future it is likely that a significant number of Waste-to-Energy plants will be equipped with CCUS technologies, thus preventing the carbon to be re-released in the incineration process.

As such, we welcome Article 4 and its scope for review, and hope for further consultations in the future to take into account the ever-changing technological landscape of waste treatment.

However, it is worth mentioning that the challenge of tracing the fate of products containing captured CO2 underscores the need for upstream accounting.

Products made from captured CO2 can re-release CO2 at their end-of-life, posing issues for WtE plants that cannot control their waste streams. Upstream accounting addresses this by attributing CO2 emissions responsibility to producers at the point of market entry, not disposal.

This method incentivises producers to design low-CO2 and/or durable products and aligns with circular economy goals and the polluter-pays principle.

Conclusion

Overall, given the importance of CCU and the Commission's goals as set out in the Industrial Carbon Management Strategy, ESWET is delighted to see these steps towards creating financial incentives for permanent carbon removal in CCU.

Given the constantly evolving technological landscape in the spheres of both carbon capture and Waste-to-Energy, we look forward to future consultations on the inclusion of technologies under this Delegated Act.

ESWET – European Suppliers of Waste-to-Energy Technology
Transparency Register #56047551356-84
Avenue Adolphe Lacomblé 59, B-1030 Brussels
info@eswet.eu / www.eswet.eu