



EUROPEAN SUPPLIERS
OF WASTE-TO-ENERGY
TECHNOLOGY

ESWET POSITION ON THE EUROPEAN COMMISSION'S CALL FOR EVIDENCE ON INDUSTRIAL CARBON MANAGEMENT – CARBON CAPTURE, UTILISATION, AND STORAGE DEPLOYMENT





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ESWET – the European Suppliers of Waste to Energy Technology – represents companies that have built and supplied over 95% of the Waste-to-Energy (WtE)¹ plants in operation in Europe. ESWET members are European manufacturers of technology which is indispensable to the EU's defossilisation and de-pollution objectives. Our association seeks to promote the technology that, within the frame of the Waste Hierarchy, recovers energy from waste that would otherwise end up in landfills.

ESWET greatly welcomes the opportunity to contribute to the European Commission's initiative on carbon capture technologies that can play a significant role in defossilising the EU economy by 2030, 2040, and 2050, including the deployment of EU-wide CO₂ transport and storage, as well as utilisation infrastructures and projects.

Background information:

As widely recognised, Carbon Capture, Utilisation, and Storage (CCUS) technologies are necessary to decrease GHG emissions and to strengthen the resilience of the EU economy and industrial systems. CCUS technologies, in fact, operate by capturing the CO₂ emissions, and by reutilising them as an alternative feedstock to produce fuels, chemicals, and materials in place of fossil equivalents. Alternatively, the captured CO₂ can be stored deep underground or reused in many different ways, including for making liquid fuel for converting hydrogen into synthetic hydrocarbon fuel or converting it into polymers. What is more, CCUS is actually a form of manifestation of the circular economy. CCUS technology, in fact, can further foster the EU's transition to a circular economy. Following their capture, emissions are kept out of the environment; this process, therefore, acts as a key player in achieving the EU's 2050 climate neutrality target. Additionally, instead of just storing the CO₂ emissions, they can be reused for many other potential applications aimed at transforming the captured CO₂ into new materials and products (e.g., building materials, feeding greenhouses, producing e-fuels). Here is where the CCUS plays its major role by enhancing a more resilient circular economy system, reducing pressure on natural resources, and creating sustainable growth.

As shown by the Global CCS Institute in its latest report, at the end of 2022, globally there were 194 large-scale CCS facilities, 146 more than in 2019, and 73 of which were developed across Europe and the UK¹. This number is destined to increase, thanks to the great impact these technologies can have on reducing greenhouse gas emissions and the fight against climate change. In 2021, the European Commission adopted a communication on sustainable carbon cycles², already recognising the importance and urgency of scaling up carbon removal technologies as part of the EU's defossilisation strategy aiming at reaching carbon neutrality by 2050. Furthermore, in November 2022, the Commission presented a proposal to boost innovative carbon removal technologies and contribute to the EU's climate, environmental and zero-pollution goals. That proposal, essential to the EU's goal of becoming the world's first climate-neutral continent by 2050,

¹ Global CCS Institute, [GLOBAL STATUS OF CCS 2022](#), 2023.

² European Commission, [Communication on sustainable carbon cycles](#), 2021

thoroughly addresses industrial technologies such as bioenergy with carbon capture and storage (BECCS) or direct air carbon capture and storage (DACCS). As better described in the following paragraphs, such technologies are already recognised as drivers of the EU's strategy to fight climate change and perfectly fit the waste management sector and its path toward zero emissions.

As ESWET, we strongly support this initiative, however, we also believe that different strategies and actions must be undertaken across Europe to further support carbon capture and usage technologies. A well-established taxation system, as well as financial initiatives, are required to boost the full carbon capture development and abate the legislative barriers. European and national investments are also necessary to make sure that CO₂ transport and storage infrastructures are out in place and that EU industries, especially the so-called hard-to-debate ones, can follow their defossilisation process and reach net zero as soon as possible.

ESWET Policy Recommendations:

1) To acknowledge the benefits of coupling CCUS applications in Waste-to-Energy plants

Technologies manufactured by the ESWET members are the heart of most of the Waste-to-Energy plants in Europe and worldwide, allowing the recovery of energy and materials from non-recyclable waste. Waste-to-energy plants treat Municipal Solid Waste (MSW) fractions that can neither be reused nor recycled, playing a key role in reducing waste volume and emissions to the environment.

The integration of CCUS technologies in WtE plants represents an opportunity for bioenergy with carbon capture and storage (BECCS), one of the few abatement technologies that can help sectors like Waste-to-Energy become carbon-negative. BECCS is also an essential part of the Integrated Resource-Recovery Facility (IRF). CCS/BECCS technology involves capturing and permanently storing CO₂ from processes where biomass is burned to generate energy. A power station fuelled with biomass and equipped with CCUS is a type of BECCS technology. Additionally, as recognised by the IPCC report, the implementation of CCUS into plants will bring additional environmental benefits by allowing the plants to become net zero or even net negative emissions energy sources, with the potential to capture "about 60 to 70 million tons of carbon dioxide annually"³ only in Europe.

In its report "Recovering the Non-Recyclable: From Waste-to-Energy to Integrated Resource-Recovery Facility", ESWET highlights how such integration can practically contribute to the acceleration of the EU's 2030 climate and energy targets⁴. Across Europe, and even globally, WtE plants are at the forefront of implementing CCUS on waste-to-energy plants with many projects already in place; moreover, the sector is one of the cost-competitive options for CCUS⁵. For instance, the Klemetsrud plant, part of the Longship project supported by the Norwegian government, is being developed to capture up to 400,000 tons of CO₂ per year⁶. In a recent briefing published by Bellona and E3G assessing the value of CCS and analysing where the deployment of CCS is most needed, the WtE sector is deeply considered. Considering, for instance, the first criterion of the four included in the methodology, WtE is indeed categorised as one of those sectors for which there are no real technological alternatives; therefore, it ranks high among the sectors that need to be prioritised in the policy agenda by, respectively, 2030 and 2050 and for which public support is highly encouraged. Additionally, the climate value resulting from the integration of CCS technologies into the WtE sector is expected to increase through 2050⁷.

Carbon utilisation of captured CO₂ from WtE plants includes sending it to greenhouses to

³ Intergovernmental Panel on Climate Change (IPCC), [Climate Change 2022: Mitigation of Climate Change](#), 2022

⁴ ESWET, [Recovering the non-recyclable: the Integrated Resource-Recovery Facility](#), 2023

⁵ Eunomia, [CCUS Development pathway for the EIW sector](#), 2021

⁶ Bellona, [Oslo leading by example: world's first CO₂ capture and storage on waste incinerator to become reality in 2026](#), 2022

⁷ Bellona, E3G, [Carbon Capture and Storage Ladder](#), 2023

promote plant growth, mineralisation for building aggregates, and various other applications such as fertiliser production, carbonated soft drinks, and the production of synthetic fuels when combined with hydrogen, also produced from WtE processes. Two successful cases of utilisation in greenhouses come from the Netherlands. The AVR Duiven plant can capture up to 100,000 tonnes of CO₂ per year and the Twence plant in Hengelo is developing a larger scale unit to also reach this capture capacity⁸.

Based on the above, it is obvious that CCUS on waste incinerators must be prioritised, considering also the fact that it is the only CO₂ abatement pathway for the sector, since WtE plants are bound to their mission to treat non-recyclable waste and thus cannot switch to a low-carbon fuel alternative. Therefore, the defossilisation of the WtE sector itself can only come with CCUS. If not duly considered in the new strategy, this sector might be drawn out of the picture of sustainable waste management, something that can only lead to increased landfilling, and hampering the waste management hierarchy and the circular economy.

That is why, as the association that represents the European suppliers of Waste-to-Energy technologies, we welcome this Commission's initiative to deploy CCUS technologies. Including the waste sector in the upcoming strategy, on one side, is crucial to safeguard the waste hierarchy and the circular economy. On the other side, it's the only solution for the sector to achieve net zero emissions, and fully defossilise itself. Both goals will be unachievable without the integration of CCUS.

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2) To acknowledge the full spectrum of CCUS applications in existing and upcoming EU legislation

ESWET welcomes the Commission's acknowledgment that, while emission reduction remains the highest priority of EU climate policies, the need to capture, use, or store CO₂ is indeed complementarily indispensable to reach climate neutrality. This intention is, indeed, already reflected in many pieces of the EU legal framework, such as the EU strategy on energy system integration to optimise defossilisation⁹ and the Communication on sustainable carbon cycles¹⁰. However, we deem that in some other files, the focus is limited only to CCS technologies and is not extended to complementary or almost equally important technologies such as the ones related to the usage of captured CO₂. The Net Zero Industry Act, for instance, foresees a simplified regulatory framework for CCS investments and sets an annual target for operating permanent CO₂ storage sites in the EU by 2030. ESWET is particularly in alignment with the Commission's view on including electrolysers and fuel cells, as well as, biomethane and biogas, as strategic net zero technologies as they represent a better alternative to fossil fuels. However, the EC's proposal does not include the complementary technologies pertaining to the transportation and storage sites, nor technologies pertaining to the usage of captured carbon¹¹.

⁸ Newest-CCUS article (2022), "No time to waste: WtE operators in the Netherlands turn up the heat on defossilisation". Available at: <https://www.newestccus.eu/news/no-time-waste-wte-operators-netherlands-turn-heat-defossilisation>

⁹ European Commission, [An EU Strategy for Energy System Integration](#), 2020

¹⁰ European Commission, [Communication on sustainable carbon cycles](#), 2021

¹¹ ESWET, [ESWET reply to EC consultation on the proposed Net Zero Industry Act](#), 2023

The inclusion of the aforementioned complementary technologies is necessary to pave the way to the future adoption of a wider EU strategy on CCUS. This will on one side allow CCUS technology manufacturers to already benefit from a simplified and harmonised regulatory framework, and on the other side, it will give priority status to the sector to fully develop potential projects.

To ensure a harmonised European framework, the upcoming strategy must take into account existing pieces of legislation, including the EU Energy Trading System Directive and the proposal for a Certification Framework for Carbon Removals.

Concerning the first file, since the beginning of the revision of the ETS Directive, ESWET's position has always been clear: the waste management chain must be regulated in a consistent way and must fall under a unique piece of legislation, avoiding disruption and any breaks to the waste hierarchy. To achieve this goal, ESWET has been advocating for a prior and conditional Impact Assessment (IA) to determine the possible inclusion of the Waste-to-Energy sector in the ETS system¹². Such an IA fits perfectly in the EU schedule by providing meanwhile to the EU legislator the necessary time to implement a CCUS strategy and to make sure that it is integrated into the residual waste treatment plants.

Another important piece of legislation is represented by the Certification Framework for Carbon Removals proposed by the Commission in 2022. The file will provide the basis for identifying high-quality industrial carbon removals and their future recognition in EU climate policies. ESWET highly welcomed the proposal to give more regulatory certainty for beneficial carbon removals through the establishment of an EU governance certification system, which we believe will spur more investment in this field across different carbon removal technologies, including CCUS¹³.

ESWET calls on the European Commission to fix this hole to acknowledge the full spectrum of CCUS applications in all existing and upcoming EU legislation, and include CCU technologies in the list of strategic net zero technologies in the Net Zero Industry Act. This would definitely create a more harmonised EU framework and pave the way for the new CCUS strategy. ESWET also calls on the legislators to make sure that the legal framework is harmonised and consistent so that the waste management chain will remain fully united and will continue to defossilise itself.

3) To make the implementation of CCUS technologies in Waste-to-Energy plants economically viable through financial instruments

Another challenge in the development of the EU's strategy for CCUS technologies is represented by the lack or the low level of infrastructure concerning the transportation, storage, and usage phases. As clearly stated by the Commission, CCUS technologies are still in an early stage when it comes to their availability and development. Additionally, prices are still not highly competitive and this represents a further challenge that retrains the full deployment of these technologies. The overall cost of CCUS for thermal waste treatment is estimated from 76 EUR/tCO to 127 EUR/t CO₂, which would be at least as cost-effective as other sectors such as glass or refining¹⁴. Current developments in solvent innovation, process integration, and intensification will lower the CO₂ capture cost over time. EU funds represent the key to unlocking the potential of these technologies and kicking off proper investments. The EU has been putting in place a resilient and multi-sourcing funding system that comprehends many programs that may already serve the cause.

¹² ESWET, [ESWET's reaction to the proposed inclusion of Waste-to-Energy in the EU ETS](#)

¹³ ESWET, [ESWET contribution to the call for evidence on the certification of carbon removals](#)

¹⁴ ESWET, [Recovery the non-Recyclable. From Waste-to-Energy to Integrated Resource-Recovery Facility](#), 2023

The EU Innovation Fund, for instance, is one of the world's largest funding programmes for the deployment of net zero and innovative technologies, aiming at investing around €40 billion from 2020 to 2030. It is certainly inspiring that out of the seven selected projects in 2021¹⁵, four had a CCS component and that carbon capture use and storage were among the three main technological pathways identified. Again in 2022, seven CCS and CCU projects were awarded funding¹⁶; one of them, the HySkies project in Sweden, aims to demonstrate the technological and economic viability of the integration at scale of four processes, including the carbon capture one¹⁷.

ESWET highly welcomes the direction EU legislators are taking toward the acknowledgment of the CCUS technologies' potential when combined with WtE plants. However, this momentum needs to be further intensified and incentivised.

In addition to EU funds, national public, and private investments must also play an important role. Enabling the public and the private sectors to invest in innovative solutions is a key element of the EU CCUS strategy. The EU can play its role by enabling the creation of a harmonised market that would incentivise investments in such technologies. Additionally, future projects must carefully consider that all parts of the value chain are operational and duly considered so that capture and storage facilities can operate confidentially and rely on solid transport and storage facilities.

ESWET calls on the European Commission to the right support and investment, CCUS technology will become a more attractive investment opportunity, accelerating the transition to a low-carbon economy as an important tool in the fight against climate change. For waste incineration, CCUS remains the best-performing emission reduction strategy.

CONCLUSIONS

Waste incineration with energy recovery is a reliable and technologically mature process, with proven effectiveness in waste management and energy generation and security. To help the Waste-to-Energy sector become fully defossilised as soon as possible, it's crucial that the EU acts timely and consistently. Taking into consideration the avoided emissions from landfill diversion, the sector can be already considered carbon neutral. Coupling WtE plants with CCUS will allow the sector to become even carbon-negative. The energy produced from waste represents an important piece of the EU energy puzzle, not only because it prevents millions of tonnes of waste from being landfilled, but because it also provides electricity and heat to consumers. Considering all of this, WtE can also be considered a carbon-neutral sector. Coupling the around 450 WtE plants currently operating across Europe with CCUS technology will allow them to go from net zero to net negative CO₂ emissions.

ESWET greatly welcomes the European Commission's acknowledgment of the momentum that must be pursued and enhanced through the development of a harmonised regulatory framework. European, national, as well as multilateral funding programmes are, without any doubt, among the instruments that the Commission needs to consider for the future deployment of the CCUS facilities.

¹⁵ European Commission, [List of proposals pre-selected for a grant](#), 2021

¹⁶ European Commission, [List of proposals pre-selected for a grant](#), 2022

¹⁷ European Commission, [Innovation Fund - Driving key innovative technologies towards the market](#), 2022



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ESWET is a European association representing the European suppliers of Waste-to-Energy technologies, committed to fostering the development and dissemination of Waste-to-Energy at the European level. ESWET also seeks to raise awareness of the positive implications of the technology in terms of better waste management, energy, and the environment.

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