Global Cement and Concrete Association

GCCA contribution to the COP 30 Presidency Roadmap for Transitioning Away from Fossil Fuels in a Just, Orderly and Equitable Manner

Solution to support Transitioning Away from Fossil Fuels: Waste Treatment

1. Context

The GCCA brings together the global cement and concrete industry, representing companies and associations committed to building a sustainable future. Our mission is to promote the essential role of concrete in building the sustainable world of tomorrow while advancing decarbonization, resilience, and innovation. Guided by our vision, we are working to deliver net zero cement and concrete by 2050, in line with global climate goals, while ensuring the material continues to contribute to safe, durable, and affordable infrastructure worldwide.

Cement is the most widely used construction material in the world, forming the backbone of modern infrastructure. However, due to the vast quantities required by society, cement manufacturing is responsible for approximately 7–8% of global CO_2 emissions. In 2020, global cement consumption was 4.2 billion tonnes, and this figure is expected to continue rising in the coming decades, driven by rapid urbanization and population growth particularly in developing economies, as well as the need to build more resilient communities in the face of a changing climate.

The use of waste in cement production provides an immediate and scalable decarbonisation pathway. It allows the cement industry to reduce its reliance on conventional fossil fuels and virgin raw materials.

2. Co-processing

Co-processing in the cement industry offers a viable win-win solution for society as an effective and sustainable management system for non-recyclable waste that also allows the industry to reduce its reliance on conventional fossil fuels and virgin raw materials.

When waste cannot be reused or recycled further, the most responsible next step is to recover value - not only the energy content but, where feasible, the mineral content as well. Co-processing in cement kilns does both: it recovers the waste's calorific value to produce clinker and simultaneously recycles the mineral content through incorporating the inorganic ash into the clinker matrix, leaving no residual ash to dispose of. Because the ash becomes part of the clinker, no secondary waste is generated, reducing pressure on landfills while simultaneously lowering the cement industry's reliance on conventional fossil fuels and virgin raw materials.

3. Co-processing benefits over other waste treatments

Co-processing provides a more efficient and resource effective alternative to waste to energy incineration and some other waste treatments, particularly for the types of mixed, contaminated waste streams that dominate municipal systems.

Incineration requires construction of new facilities, converts only part of the waste's calorific value into electricity and leaves all mineral content (ashes) to require further treatment or disposal. In contrast, cement kilns already exist, and coprocessing uses the energy content of the waste at the point of energy demand and incorporates the remaining mineral fraction directly into clinker, eliminating residual ash altogether.

In cement plants, the primary activity is the production of cement, with the use of waste as fuel or raw material undertaken in support of that core manufacturing process, whereas in incineration or waste-to-energy facilities the primary function is waste treatment, with energy recovery as a secondary outcome.

Co-processing offers a viable treatment route for contaminated waste streams that cannot be readily treated by other options, as cement kilns can safely and fully manage mixed materials containing plastics, textiles and organic residues; for example, fractions that are unsuitable for biogas production composting, biomethanisation, or recycling.

By diverting waste from landfills, co-processing reduces landfill methane emissions, avoids the need for expensive new disposal infrastructure, and supports a more circular, resource efficient economy.

4. Safety and regulations

Long retention times, high temperatures and strict control of chlorine levels mean cements kilns have lower emissions to air than waste incineration plants. Waste materials undergo a rigorous acceptance and inspection procedure before being used in cement kilns. Application of Best Available Techniques (BAT) and Best Environmental Practices (BEP) ensure a high level of protection of human health and the environment.[1],[2]

Co-processing complements, and does not compete with, reuse and recycling. GCCA guidance is explicit that acceptance criteria and governance should prevent diversion of recyclable streams into kilns. Operators are expected to demonstrate

[1] UNEP Basel Convention (2011): Technical guidelines on the environmentally sound co-processing of hazardous wastes in cement kilns: as adopted by the 10th meeting of the Conference of the Parties to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (decision BC-10/8), Cartagena, Colombia.
[2] JRC (2013): Best Available Techniques (BAT) Reference Document for the Production of Cement, Lime and Magnesium Oxide (europa.eu) (Accessed: March 2026)

compliance with waste hierarchy principles, document feedstock provenance, and prioritise non-recyclable fractions. [3]

5. Global substitution rates and potential

On average globally, waste use in cement production is forecast to increase from 6% in 2020 to 22% and 43% by 2030 and 2050 respectively, with the enabling policy enablers in place. GCCA data, sourced from cement plants representing a quarter of global production, shows an increase from 19% to 24% for 2020 and 2023 respectively.[4] This increase is in line with the forecast increase across total production.

As an indicator of what is possible with enabling policies and regulations, in Europe the cement sector is substituting on average 53% to 56% of its fossil fuel with waste derived fuels.[5] Some kilns already operate at above 90% substitution of fossil fuels.

While co-processing is an important solution for treating non-recyclable waste and reducing reliance on fossil fuels and virgin raw materials, it should be understood as a complementary component within an integrated waste-management system, not a primary outlet for society's waste. The cement sector's capacity to consume waste remains limited to only a single-digit percentage of the overall waste generated by society.

6. Policy enablers

Regions with landfill restrictions, clear permitting rules, robust sorting and pretreatment infrastructure, and predictable gate fee economics consistently achieve higher fossil fuel substitution rates than the global average.

To increase the use of waste in cement production, governments should recognise co-processing in cement kilns as a sustainable waste management solution that delivers simultaneous energy recovery and material recycling, and embed this approach within national waste and climate policy frameworks. To unlock its full potential, governments should incentivise effective municipal collection, sorting and pretreatment waste systems to secure consistent, high-quality waste streams, while enabling efficient environmental permitting for cement plants to access these materials.

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[3] GCCA Sustainability Guidelines for co-processing fuels and raw materials in cement manufacturing (2018): https://gccassociation.org/wp-content/uploads/2019/03/ GCCA_Guidelines_FuelsRawMaterials-v0.pdf

[4] GCCA Cement and Concrete Industry Net Zero Action and Progress Report 2025/26: https://gccassociation.org/wp-content/uploads/2025/11/GCCA_ProgressReport_2025_AW_FINAL.pdf

[5] Cement Europe Action Plan (2025): https://www.cementeurope.eu/cement-action-plan/

Co-processing is included as a standalone operation in the recommendations of the Expert Working Group on the review of the Annex IV of the Basel Convention, which lists all operations used for the transboundary movement of hazardous waste. As the discussions to reach a consensus amongst countries are currently under progress, it will be very important to have the maximum support possible for co-processing being definitely included in the final version of Annex IV.

Targeted fiscal incentives are needed to level the playing field with other waste treatment and energy recovery options and to encourage investment by industry.

Finally, supporting knowledge transfer across regions and promoting public-private partnerships can help share risks, build capacity and ensure the long-term sustainability and scalability of coprocessing as a key part of modern waste management systems.

7. Conclusion

Co-processing of waste allows the cement industry to reduce its reliance on conventional fossil fuels and rely more on locally sourced waste.

Co-processing of wastes in properly controlled cement kilns provides energy recovery and materials recycling while cement is being produced, offering the most favourable environmentally sound recovery option for many waste materials. As countries strive to address waste management and, in some cases, reduce exporting of waste, properly controlled co-processing can provide a practical, cost effective, and environmentally preferred option to landfill and incineration, while reducing the industry's reliance on conventional fossil fuels and virgin raw materials.

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