



## Driving Sustainability in the Cement Industry

- The cement industry is a major contributor to global emissions, accounting for 5–8% of the world's carbon dioxide (CO<sub>2</sub>) emissions each year.
- This makes it one of the largest energy consumers and CO<sub>2</sub> emitters, and a key driver of climate change.
- As regulatory pressures, investor expectations, and market demands evolve, reducing emissions has become critical for cement manufacturers.
- At Zero Carbon One, we provide advanced Greenhouse Gas (GHG) audits and benchmarking services tailored to the cement sector, helping manufacturers lower their carbon footprint through innovative material choices and process optimizations.

# Reducing Emissions in Cement Production: The Role of Clinker

Clinker production, which involves the calcination of limestone, is responsible for the majority of CO<sub>2</sub> emissions in cement manufacturing. To meet decarbonization goals, the industry must focus on reducing clinker content and exploring alternative materials. Our GHG auditing services cover key emission points

## Scope 1

Direct emissions from fuel combustion and raw material conversion (e.g., clinker production).

## Scope 2

Indirect emissions from electricity use in cement plants.

## Scope 3

Indirect emissions from upstream and downstream activities, including transportation and raw material supply chains.

By aligning with international standards such as the Greenhouse Gas Protocol, Science-Based Targets initiative (SBTi), and IPCC guidelines, we ensure your emissions strategies are globally recognized and technically robust.





## Innovative Approaches to Clinker Reduction and Emission-Lowering Materials

### Low-Carbon Clinker Substitutes

Replacing traditional clinker with supplementary cementitious materials (SCMs) such as fly ash, blast furnace slag, and natural pozzolans is a key strategy for reducing emissions. These materials can significantly lower the carbon intensity of cement without compromising performance, and they reduce reliance on energy-intensive clinker.

### Blended Cements

Blended cements incorporate SCMs in the cement mix, reducing the proportion of clinker. By optimizing the blend ratios, cement manufacturers can achieve substantial emission reductions. For example, the use of Portland Limestone Cement (PLC) can reduce CO<sub>2</sub> emissions by up to 10% compared to traditional Ordinary Portland Cement (OPC).

## Alternative Fuels and Energy Efficiency

Switching from traditional fossil fuels to alternative fuels such as biomass or waste-derived fuels is another way to reduce emissions. Additionally, implementing energy-efficient technologies, such as pre-calcliner systems and waste heat recovery, can further lower the carbon intensity of cement production.

## Carbon Capture, Utilization, and Storage (CCUS)

While clinker reduction and alternative materials are key short-term strategies, long-term solutions involve carbon capture, utilization, and storage (CCUS). CCUS technologies capture CO<sub>2</sub> emissions during the cement production process and either store them underground or repurpose them for use in other industrial processes, making significant strides toward carbon neutrality.





# How Our GHG Auditing Services Support Clinker Reduction

## Data-Driven Insights for Emissions Management

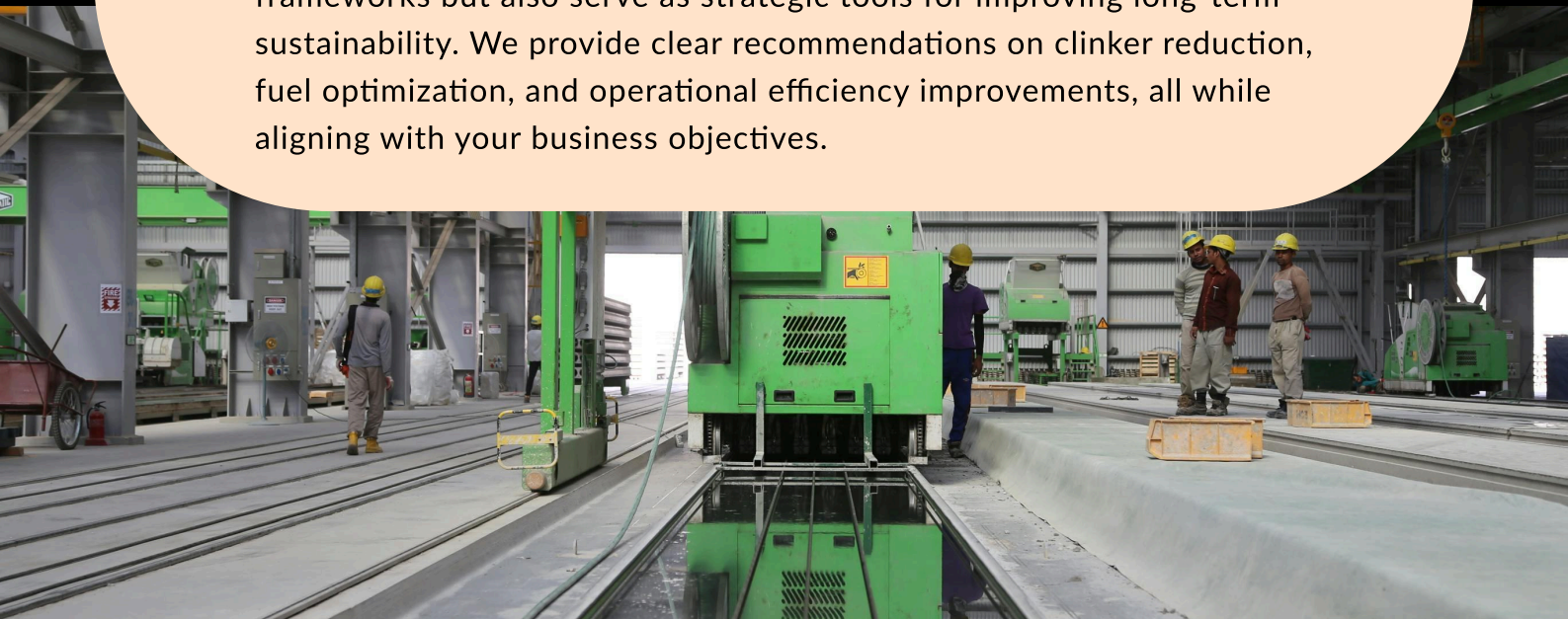
We assess emissions data across the production process, from kiln performance to the raw materials used. By leveraging advanced AI and machine learning models, we identify areas where clinker content can be reduced, or alternative fuels and materials can be introduced. This results in a tailored, data-driven emissions reduction strategy that maximizes efficiency.

## Benchmarking Against Best Practices

We provide benchmarking services that measure your performance against both regional and global industry leaders. By identifying where your emissions reduction strategies stand in relation to your peers, you can make informed decisions on adopting cutting-edge practices such as the increased use of SCMs or integrating CCUS technologies.

## Comprehensive Reporting and Recommendations

Our detailed reports not only assess compliance with regulatory frameworks but also serve as strategic tools for improving long-term sustainability. We provide clear recommendations on clinker reduction, fuel optimization, and operational efficiency improvements, all while aligning with your business objectives.



# Benefits of GHG Audits for the Cement Industry

## ***Regulatory Compliance and Future-Readiness***

Ensure compliance with current and future sustainability regulations, and future-proof your business by adopting low-carbon technologies and reducing your reliance on high-emission clinker production.

## ***Operational Efficiency and Emission Reduction***

Through clinker reduction strategies, the adoption of alternative materials, and energy-efficient kiln technologies, your business can achieve significant reductions in both emissions and operating costs.

## ***Strengthened Market Position***

Sustainable cement production is a growing demand among consumers and investors alike. Cement manufacturers that invest in low-carbon materials and technologies are positioned as industry leaders in sustainable construction materials, enhancing their market reputation.

## ***Long-Term Decarbonization Pathway***

Use our insights to develop a long-term decarbonization strategy that includes reduced reliance on clinker, alternative fuels, and integration of carbon capture technologies, ensuring alignment with global climate targets.

# Partner with Zero Carbon One

At Zero Carbon One, we are committed to helping the cement industry lead the way in sustainability. With our GHG auditing, benchmarking, and emissions reduction expertise, we support cement manufacturers in their journey toward a low-carbon future.

Contact us at [info@zerocarbon.one](mailto:info@zerocarbon.one) to discover how we can help you implement clinker reduction strategies and other innovative solutions to reduce emissions.