



The Ceramics Industry and Climate Change mitigation



The ceramics industry has a heavy impact on greenhouse gas emissions. There are two main sources of emissions within the ceramics production process.

On the one hand, those caused by the process, due to decarbonisation of the clays and some auxiliary materials with a natural carbon content that is released during the baking process. These emissions are very difficult to avoid, as they are intrinsic to the process itself. Some R&D&I projects are working to open up new approaches to allow feasible mitigation alternatives in the future.

On the other hand, there are the emissions generated by burning fossil fuels to power the process. Fossil fuels are used due to the high energy requirements of the process.

It is this aspect where most of the efforts for improvement are centred and where we find the greatest opportunities for mitigating emissions. The use of biomass as an alternative fuel, the use of cleaner fossil fuels than those used, the use of cogeneration for electricity and heat production, or general measures for improving energy efficiency, are the most usual alternatives that we see implemented in the sector.

Greenhouse gas emissions mitigation alternatives for the ceramics industry

GENERAL

The use of alternative fuels is the most significant option for application in the ceramics industry.

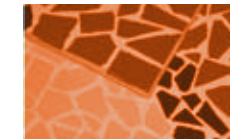
- Use of biomass
 - From the point of view of greenhouse gas emissions it is always the best alternative.
 - Barriers to the use of biomass: availability, guaranteed supply, quality and price of the biomass, as well as inertia in the use of fossil fuels.
- Use of cleaner fossil fuels
 - Use of fossil fuels with a low carbon content per thermal unit generated is recommended
 - Among fossil fuels, natural gas is the one that generates the lowest CO₂ emissions

BRICKS AND ROOF TILES SUBSECTOR

- Optimisation of production capacity.
- Use of pre-kilns fed with residual boilers.
- Use of high-speed burners in pre-heating.
- Extrusion with steam.
- Improvement in the distribution of heat in dryers.
- Substitution of diesel/small furnaces for air-veins.
- Hard extrusion.
- Heat recovery in gases from furnace to dryers.
- Reuse of water circuits in cogeneration to pre-heat boiler water.
- Implementation of recovery boilers for steam production in cogeneration.
- Control of the mixing water.
- Control of the moisture of the dryers.

GLAZED WALL TILES AND FLOOR TILES

- Improved oven design and optimisation of operation.
- Improved dryer design and optimisation of the recirculation of air in dryers.
- Recovery of cooling air from furnace to dryer.
- Recovery of cooling air like air from clean fuels.
- Recovery of heat from furnace gases to atomisers.
- Substitution of diesel and solid fuels with clean fuels.
- Modification of the body or the ceramic stand.
- Automatic control of the moisture from atomisers.
- Monitoring and tracking of emissions
- The use of Cogeneration for the production of electricity and heat



Case study: Piera Ecocerámica (Spain)

(Source: Fundación Empresa & Clima)

Piera Ecocerámica is a company dedicated to the manufacture of structural ceramics from fired clay. This type of industry involves a very high energy consumption and therefore significant CO₂ emissions to the atmosphere. Piera Ecocerámica conducted a feasibility study to assess the possibility of obtaining energy from the landfill Can Mata, which would enable the industry to operate on biogas.

GENERAL MEASURES TO REDUCE EMISSIONS

- In order to use biogas the following aspects were considered:
- The need to ensure a constant flow and pressure of biogas.
- To prevent the chemical composition of biogas from altering properties of the bricks, such as their colour.
- To design a system that allows the simultaneous use of natural gas and biogas.

RESULTS

With the use of biogas:

- Significant reduction in environmental pollution
- Reduced energy costs
- Conversion of hazardous wastes into clean energy that is useful for the manufacture of finishing bricks and paving tiles.

INVESTMENT COST AND AMORTIZATION

	Before the action	After the action
Energy consumption (kWh / year)	59.637.600	59.637.600
Energy price (€ / kWh)	0,024794	0,015298
Invoice thermal energy (€ / year)	1.478.654	912.336
Investment (€)		676.000
Annual savings (€)		566.316
Return period (years)		1,2