

The Issue

The increasing scarcity of fossil fuels, unsustainable waste management practices, and climate change—these three global problems might seem to have little in common. However, they are the main drivers behind the growing substitution of so-called alternative fuels (AF) for conventional fuels in cement kilns that we have witnessed over the last decade. AF are predominantly wastes or by-products from industrial, domestic, agricultural, and forestry processes—including used tires, spent solvents and waste oils, processed municipal solid waste, and biomass¹ such as rice and coffee husks, animal meal, and sewage sludge—which contain recoverable energy.

Replacing traditional fossil fuels with AF reduces overall carbon dioxide (CO₂) emissions because, in traditional methods of disposal, many of the AF used will otherwise generate CO₂ emissions with no energy recovery. Therefore, emissions generated by the combustion of AF with biomass content are considered “carbon neutral”. In fact, during the natural decomposition process that occurs when waste is landfilled or left in the fields (as is the case with agricultural organic waste), methane gas is produced. Methane, a powerful greenhouse gas, is 25 times more potent (global warming potential²) than CO₂ at preventing infrared radiation from escaping the planet. Using such materials as AF in cement kilns results in the avoidance of the production and release of methane gas.

The cement manufacturing process has a unique ability to transform many residues into harmless, even useful, materials by incorporating them into the process. In addition, the cement kiln is far superior to competing alternatives as an effective and efficient energy recovery option. For example, waste incinerators have lower or even no energy recovery. A typical waste-to-electricity plant requires two or more units of AF to replace one unit of conventional energy; whereas in a cement plant, the ratio is close to one, which yields maximum benefits in terms of resource savings and CO₂ emission reductions. Nearby communities' concerns are typically related to emissions from the kiln stack or groundwater contamination by runoff and leakage.

¹ Biomass, a renewable energy source, is biological material such as wood, waste, and alcohol fuels commonly used to produce heat.

² IPCC: www.ipcc.ch/publications_and_data/ar4/wg1/en/ch2s2-10-2.html

Numerous scientific studies, as well as numerous years of practical experience, have shown that many of these concerns are far overstated. The special conditions in the kiln—with its high temperatures of up to 1,450°C—careful sourcing, and responsible practices in the plant are important factors in the effective control of potential negative impacts on the environment, the health of workers and neighbors, and the quality of the product. By now, many stakeholders have realized that the use of AF in cement plants offers a wide range of benefits to society.

CEMEX's Position

Given the high-energy intensity of our operations, AF comprise a key pillar of our carbon and energy strategy, which allows us to reduce our environmental footprint and maximize the contribution of our plants to society.

The benefits of substituting AF for conventional fuels include:

- **Resource saving:** By recovering energy from wastes, AF save non-renewable conventional fossil fuels, contributing to the sustainability of our world.
- **Waste management:** AF offer local communities and governments a neat, final, and environmentally friendly solution to dispose of wastes, effectively avoiding the use and hygienic challenges of landfills.
- **Local economic development:** In many cases, the economic activity related to the development of the AF supply chain fosters local value creation and employment.
- **Climate change mitigation:** AF, particularly biomass fuels and the biomass fraction of household wastes, help reduce our CO₂ footprint and eliminate emission of this most important greenhouse gas.
- **Potential local environmental benefits:** Many AF have also been shown to reduce other kiln emissions—particularly nitrogen oxide (NO_x)—thereby enhancing local air quality.

CEMEX has developed corporate guidelines for the use of AF that are compatible with the AF guidelines developed by the Cement Sustainability Initiative and are meant to complement local regulation.

Among other directives, these guidelines require:

- The careful preparation of any AF project, including early consultation with stakeholders, feasibility studies—comprising product quality, environmental, health, safety, and community issues—and an industrial test phase.
- A list of some types of AF excluded from our operations such as radioactive material or medical waste.
- Compliance monitoring.



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In 2003, AF provided only around 2% of the global thermal energy in CEMEX's cement kilns. By contrast, our AF substitution rate improved to 20.3% in 2010, 24.7% in 2011 and 27.1% in 2012, saving the equivalent of 2.3 million tons of coal and avoiding 1.8 million tons of CO₂ emissions. Our goal is to reach an alternative fuels substitution rate of 35% by 2015. Some of our European plants have achieved substitution rates exceeding 70%. These rates are the result of several factors—from the constant and thorough engagement with stakeholders (e.g., neighbors, suppliers, and authorities), to the development of operational expertise³ and dedicated technology (e.g., gasifiers³), to the availability of suitable AF.

CEMEX has the know-how to source, process, store, and recover energy from AF in a responsible way. Still, in many countries, our AF substitution rate is low, far below its real potential. The reason is that our technical know-how must be matched by appropriate waste management regulations that are, in most cases, similar to those of many European countries.

Mexico and the United States are examples of our worldwide support for the enactment and enforcement of legislation that promotes the energy recovery—and multiplies the corresponding benefits for society—from those wastes that cannot be reduced, reused, or recycled. Without such

³ Gasification is a process that converts carbonaceous materials, such as coal, petroleum, biofuel, or biomass, into carbon monoxide and hydrogen.

regulation, unsustainable practices of waste disposal such as landfills or incineration without energy recovery will prevail.

Looking Forward

CEMEX is committed to further increasing its use of AF. We will continue to:

- Disseminate know-how within our organization and among our local stakeholders to increase awareness of the benefits arising from an extensive use of AF.
- Identify sources of agricultural, industrial, and urban waste that can be transformed into AF in order to fulfill our substitution target, which is the most ambitious among the global cement producers.
- Collaborate with policy makers to develop adequate waste management regulations.
- Engage with stakeholders to promote a balanced view of risks and opportunities of using AF in cement kilns.



CEMEX is committed to further increasing its use of alternative fuels.