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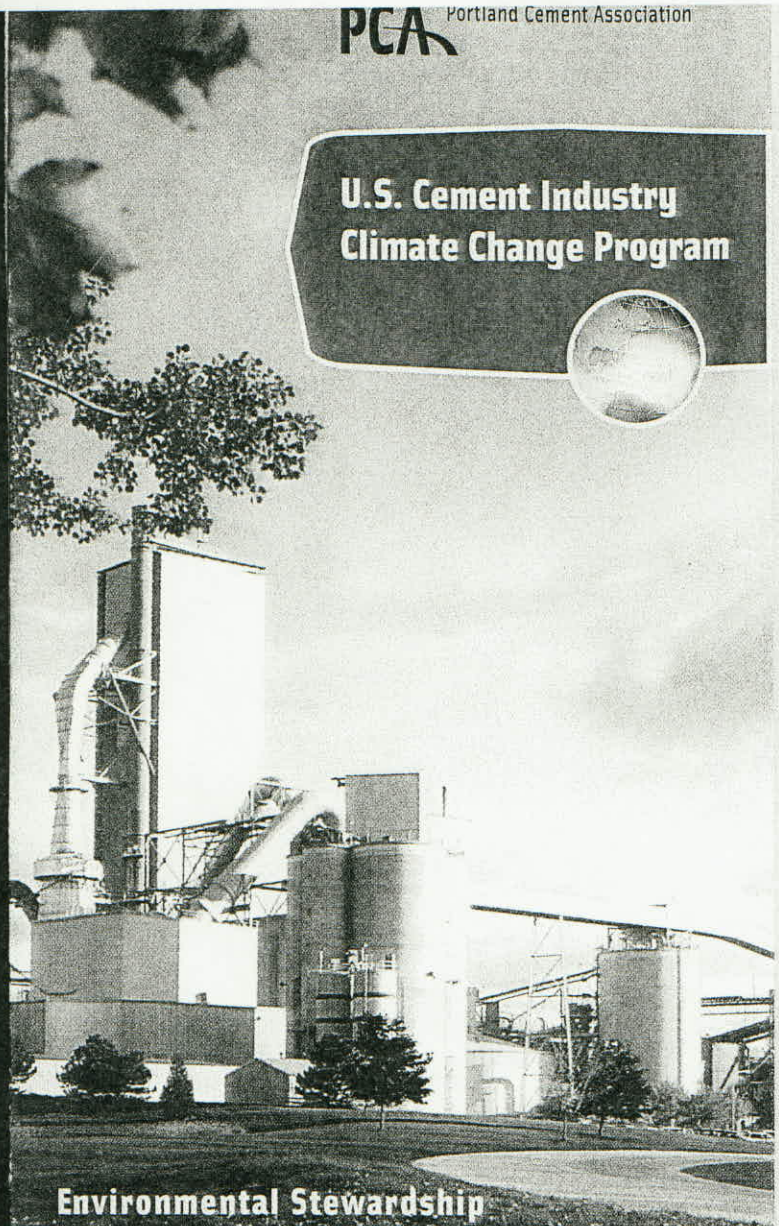
PCA Portland Cement Association

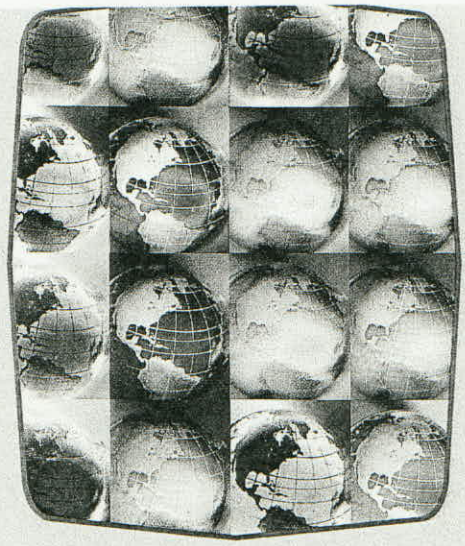
U.S. Cement Industry Climate Change Program



Environmental Stewardship

The cement industry is committed to making a high-quality product safely and efficiently. That commitment involves minimizing emissions, waste, energy consumption, and the use of virgin raw materials.

The U.S. cement industry began to address climate change in the mid-90s—one of the first industries to study this issue. Working with the Environmental Protection Agency (EPA) and its Climate Wise Program, the cement industry developed a carbon dioxide (CO_2) emissions protocol and a means by which to record emissions reductions through the Department of Energy's 1605(b) Greenhouse Gas Reporting Program.



Global Commitment

The U.S. industry was then able to quantify accurately cement industry CO_2 emissions and ways to reduce them. In July 2001, this assessment culminated in the adoption of a voluntary CO_2 emission reduction goal. Similar efforts have since been initiated around the world, including the development of a global protocol for measuring cement-industry greenhouse gas emissions, prepared under the auspices of the World Business Council on Sustainable Development.

Voluntary Goal

The U.S. cement industry has adopted a voluntary goal of reducing CO_2 emission by 10% (from a 1990 baseline) per ton of cementitious product produced or sold by 2020.

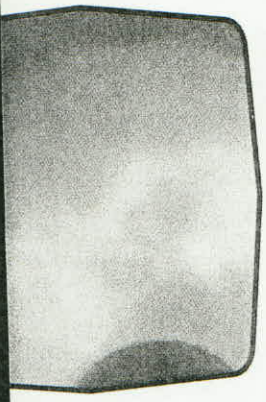
The industry is now implementing a three-part program to achieve this goal and to foster reductions by cement users. The three parts address the manufacturing process, product formulation and product application.

Part 1. Process: Reduce emissions through increased efficiency and decreased fuel use.

Kiln types: Continue conversion from less efficient wet kilns to preheater/precalciner kilns.

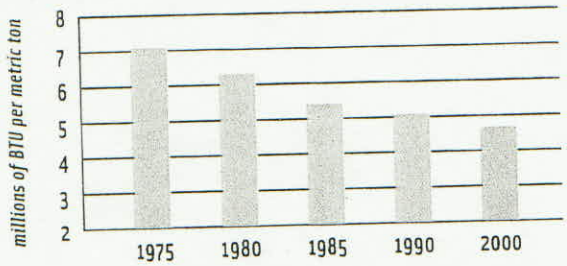
Demand-side energy management: Reduce electricity and fuel use through the application of more efficient fans, motors, and other equipment utilized in making cement.

Alternative fuels and raw materials: Use alternatives to conventional fuels and raw materials to reduce greenhouse gas and other pollutant emissions.

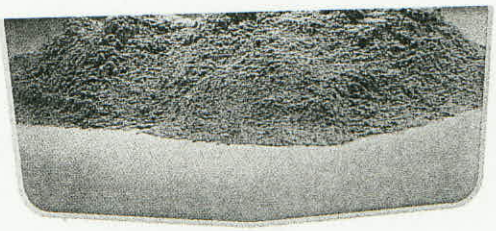


Cement plants have two sources of carbon dioxide emissions. The first is from fossil fuel combustion to heat the kilns. The second is inherent in the process itself. The chemical reactions that convert limestone and other raw materials to clinker—called calcination—releases carbon dioxide.

Energy Consumption



Increased efficiency, new technology and equipment, and alternative fuels and raw materials have reduced energy consumption by one-third.



Cement or concrete? The terms cement and concrete are often misused. Cement is an ingredient of concrete. It is the fine gray powder that, when mixed with water, sand, and gravel or crushed stone, forms the rock-like mass known as concrete. Cement acts as the binding agent or glue.

Part 2. Product Formulation: Produce cement using a lower proportion of calcined materials, thereby reducing CO_2 emissions per unit of product.

The U.S. cement industry has adopted a voluntary goal of reducing CO_2 emission by 10% (from a 1990 baseline) per ton of cementitious product produced or sold by 2020.

Concrete's durability constitutes an environmental benefit. It will not rust, rot, or burn, saving energy and resources needed to replace or repair less durable materials.

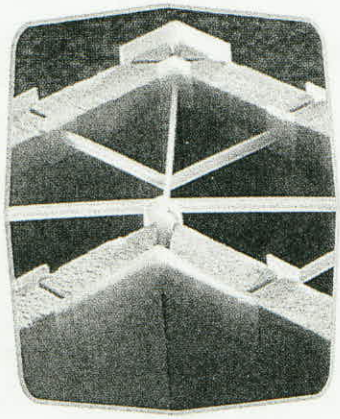
Part 3. Product Application: Promote the use of concrete as a solution to climate change.

Energy-efficient structures: Commercial and residential structures built with concrete exterior walls enhance energy efficiency.

Urban heat island mitigation: Light-colored concrete absorbs less heat and reflects more light than dark-colored materials—whether on pavement, roofs, or other surfaces, thereby reducing ambient temperatures.

Vehicle fuel efficiency: Because of its rigidity, concrete pavement enhances fuel efficiency of vehicles when compared to flexible pavements.

Life-cycle analysis: Because of the three applications above, and other benefits, cement-based concrete compares favorably to competing products; these results should be taken into account in product-selection guidance.



Concrete buildings and homes reduce the energy required for heating and cooling. New wall systems combine concrete with foam insulation to reduce energy needs

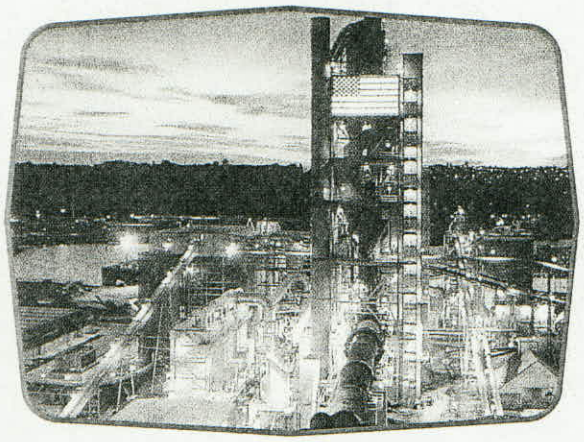
In 2000 the cement industry received EPA's Climate Protection Award for its partnership with Climate Wise.

PCA and its member companies are active in international and domestic efforts to measure and reduce greenhouse gases, such as the following:

- The EPA Climate Wise program
- The EPA Climate Leaders program
- The EPA Energy Star program
- The Department of Energy 1605(b) Greenhouse Gas Reporting program
- The World Resources Institute/WBCSD GHG Protocol
- The Pew Center on Global Climate Change
- The World Wildlife Federation Climate Savers program
- The World Business Council for Sustainable Development (WBCSD) report on a sustainable cement industry.

four basic steps:

1. Raw materials—limestone with smaller quantities of clay and sand—usually come from a quarry near the plant.
2. The materials are blended in the right proportions, then ground together.
3. The materials are heated in an industrial furnace—called a kiln—to form an intermediate product called clinker. Kilns reach temperatures of 1870 degrees Centigrade (3400 degrees Fahrenheit).
4. Once cooled, the clinker is ground with a small amount of gypsum into the fine gray powder known as portland cement.



At each stage, process data are continuously monitored to produce a high-quality product, improve energy efficiency, and minimize emissions.

PCA is a trade association representing cement companies in the United States and Canada. PCA's U.S. membership consists of 45 companies operating 101 plants in 35 states. PCA members account for more than 95 percent of cement-making capacity in the United States and 100 percent in Canada.

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The CO_2 reduction goal is part of the U.S. cement industry's Continuous Environmental Improvement program. Through this program, the industry sets voluntary emission and waste reduction goals, operates an environmental awards program, and furthers the industry objective of achieving continuous improvement in environmental performance.

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