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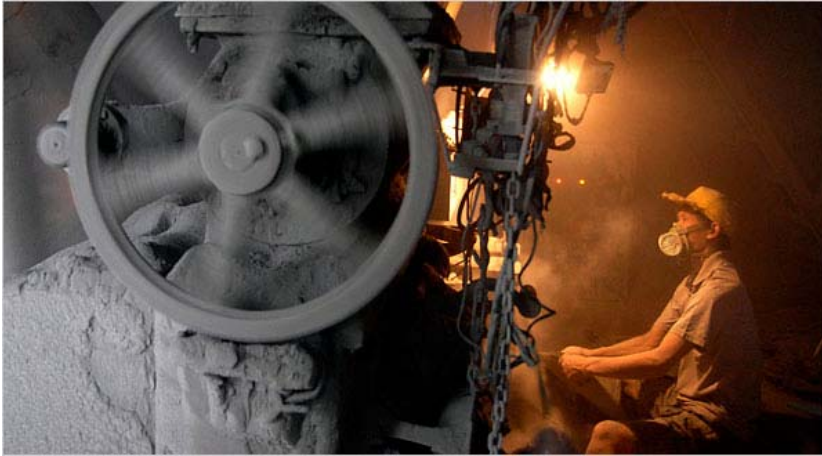
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Cement Industry Is at Center of Climate Change Debate

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A cement plant worker in China. Making cement to bind concrete produces carbon dioxide that causes global warming.

By ELISABETH ROSENTHAL Published: October 26, 2007

Correction Appended

PARIS, Oct. 23 — In booming economies from Asia to Eastern Europe, cement is literally the glue of progress. A binding agent that holds the other ingredients that together make concrete, cement is a crucial component in buildings and roads — which is why some 80 percent of it is made and used in emerging economies.

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Cement: A Global Pollutant

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Reuters

China alone makes and uses 45 percent of worldwide output. In places like Ukraine, production is doubling every four years.

But making cement means making pollution, in the form of carbon dioxide emissions. Cement plants account for 5 percent of global emissions of carbon dioxide, the main cause of global warming. Cement has no viable recycling potential; each new road, each new building needs new cement.

Now, green incentives may be increasing pollution. The European Union subsidizes Western companies that buy outmoded cement plants in poor countries and refit them with green technology. But the greenest technologies can reduce carbon dioxide emissions by only about 20 percent.

So when Western companies revamp Eastern factories, the emissions decrease for each ton of concrete produced. But the amount of cement produced often goes way up, as does the total pollution generated.

Many of the world's producers acknowledge the

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A cement plant in China. Demand for cement grew after old plants in Asia and Eastern Europe were refurbished.

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Jianan Yu/Reuters
Unloading cement at a dock in eastern China.

conundrum. “The cement industry is at the center of the climate change debate — but the world needs construction material for schools, hospitals and homes,” said Olivier Luneau, head of sustainability at Lafarge, the global cement giant based in Paris. “Because of our initiatives, emissions are growing slower than they would without the interventions.”

Cement manufacturers have invested millions of dollars in green programs, like the Cement Sustainable Initiative. Lafarge, a leader in doing so, has improved efficiency by decreasing emissions to 655 pounds of carbon dioxide for each ton of cement in 2006 emissions from 763 pounds in 1990. Its goal is to get to 610 pounds for each ton by 2010, but the company said it expected it would be difficult to get much below that number. Lafarge, which bought 17 cement plants in China in 2005 and has holdings

throughout Eastern Europe and Russia, acknowledges that its total emissions are growing each year.

Many engineers, like Julian Allwood, a professor at the University of Cambridge in England, see sustainable cement as something of a contradiction in terms — like [vegetarian](#) meatballs.

Cement poses a basic problem: the chemical reaction that creates it releases large amounts of carbon dioxide. Sixty percent of emissions caused by making cement are from this chemical process alone, Mr. Luneau of Lafarge said. The remainder is produced from the fuels used in production, although those emissions may be mitigated with the use of greener technology.

“Demand is growing so fast and continues to grow, and you can’t cap that,” Mr. Luneau said. “Our core business is cement, so there is a limit to what we can change.”

Carbon trading arrangements— green incentives created by the European Union and the Kyoto agreement on curbing greenhouse gases — encourage purchases in Eastern Europe and Russia by Lafarge and competitors, like HeidelbergCement. But they also allow manufacturers to increase total production, both in the developing world and at home.

The European Union effectively limits production of European cement makers in their home countries by capping their yearly emissions allowances. But there are no limits in places like Ukraine.

Moreover, European companies get increased emission allowances at home — carbon credits — by mounting green cleanup projects elsewhere. So buying an old Soviet factory and converting it to green technology can bring multiple paybacks.

“The investment is much more attractive than it used to be,” said Lennard de Klerk, director of Global Carbon, a Budapest firm that brokers such carbon investments in Ukraine, Russia and Bulgaria. Factor the value of the carbon credits into the cost of refitting a factory in Ukraine, and the predicted rate of return rises to almost 12 percent from 8.8 percent, he said.

Once the outmoded plants are refitted with clean technology, their emission for each ton of cement produced declines. The Podilsky plant in Ukraine is being refitted with greener kilns — a project financed by the Irish cement manufacturer CRH — and energy consumption for each ton of cement produced is expected to drop by 53 percent.

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But even that sharp drop may not be enough to stop the inexorable growth in cement emissions over all, or compensate for the new lease on life that refitting provides old factories that otherwise might have shut their doors.

At the Doncement plant of HeidelbergCement in Ukraine, output soared 55 percent in the first nine months of 2006. Total production went up more than 10 percent in Ukraine in 2005 and again in 2006.

One industry project called the Cement Sustainability Initiative suggests that concrete should be mixed using smaller portions of cement to reduce emissions. But there is less incentive for manufacturers to make fundamental changes in how buildings and roads are made.

Mr. Allwood suggested that one solution might be to make concrete in blocks like large sugar cubes that could be stacked to make buildings and reused if they are demolished.

Western cement manufacturers emphasize that the emissions problem cannot be solved until China and India and other booming economies realize that they must limit emissions as well.

"Trying to solve emissions in the E.U. or [G-8](#) will not solve the problem unless emerging economies and their cement production are included," Mr. Luneau said.

Correction: October 29, 2007

A picture credit was omitted in Business Day on Friday with an article about the heavy pollution of China's cement industry. The photograph of workers unloading cement bags at a dock in eastern China was by Jianan Yu of Reuters.

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