

A major push on the household treatment front came last year from the Bill and Melinda Gates Foundation, which stepped in with \$17 million and resources to further study simple point-of-use water treatments. Their end goal: determine which devices to mass produce and

how best to promote them.

But researchers and policy makers alike emphasize that household water treatments may be appropriate only under certain circumstances.

“There’s no single answer to the water supply and sanitation prob-

lem,” says Peter Gleick, director of the nonprofit Pacific Institute. “Point-of-use systems can be effective, and can be a critical component, but they must not be allowed to derail the larger efforts to get cheap water for everyone.”

—NAOMI LUBICK

Ocean fertilization—time to regulate?

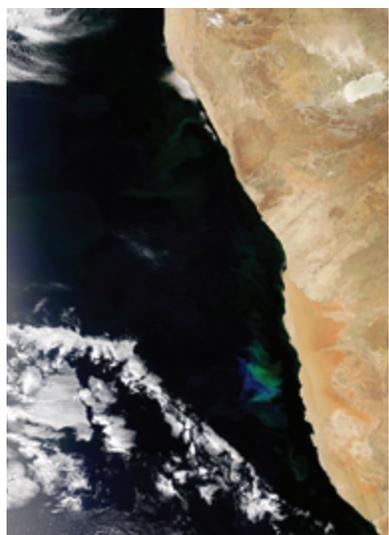
With global carbon emissions exceeding 8 gigatons annually and the effects of climate change looming ever larger, scientists and commercial interests have warmed to geoengineering schemes for mitigation that once were dismissed as science fiction. At the same time, the global market for carbon credits is ballooning, and canny entrepreneurs are jumping at opportunities to exploit it.

One possible contender for lowering the atmosphere’s greenhouse gas burden, at least among entrepreneurs, is the “fertilization” of CO₂-absorbing ocean phytoplankton with micronutrients such as iron or nitrogen. The concept is leapfrogging from small-scale scientific demonstrations to potentially large-scale commercial activities, with a virtual absence of government oversight and research into potential ecological effects. Scientists, environmentalists, and policy makers are calling for a clear regulatory framework in an effort to slow down the race to commercialization and allow the science to catch up.

From 1993 to 2005, publicly funded researchers conducted about a dozen experiments that released iron over relatively small areas of open ocean. Accurately measuring the effects in moving water was problematic, and overall the outcomes were mixed. But the results were promising enough to encourage several companies to launch plans for marketing ocean fertilization (OF) carbon credits to the growing numbers of individuals and corporations looking to off-

set their carbon footprints.

In October 2007, Australian-based Ocean Nourishment Corp. began a series of experimental releases of nitrogen-containing urea into the Sulu Sea near the Philippines to trigger plankton blooms.



Phytoplankton blooms, such as this one in Atlantic waters off the coast of Namibia, Africa, absorb large amounts of CO₂.

The experiments were conducted without permission from the Philippines government, which has since protested the event.

Such schemes raise the specter of a “Wild West” atmosphere that many scientists find disturbing. Kenneth Coale, a chief scientist on three “iron expeditions”, says, “It behooves us to find out what role the oceans could play to ameliorate climate change, but it’s alarming that market demands for carbon credits could end up driving this

process.” Coale emphasizes that previous demonstrations were designed specifically to investigate questions on climate history. “None addressed the ecological consequences of much larger scale or frequent fertilization efforts for climate mitigation,” he stresses.

Researchers recently gathered at Woods Hole Oceanographic Institution to discuss thorny questions, such as whether broadscale nutrient seeding could produce greenhouse gases, generate harmful algal blooms, turn ocean midwaters eutrophic, or otherwise fundamentally alter marine ecosystems. Oceanographer John Cullen of Dalhousie University (Canada) warned that the collective impacts on the oceans could be not only catastrophic but also impossible to trace to any single liable party.

Because OF would occur on the high seas, jurisdiction logically falls into the realm of international law. At a November meeting of the contracting parties of the Convention on the Prevention of Marine Pollution by Dumping of Waste and Other Matter, a voluntary agreement that has been ratified by 81 nations, delegates issued a statement of concern on OF. According to the statement, large-scale OF isn’t yet justified because of gaps in scientific knowledge, and signatory countries should “use the utmost caution when considering [such] proposals.” Convention representatives agreed to address legal and scientific issues and decide on regulations at their next meeting in 2008.

Because the convention has no enforcement powers, the ultimate responsibility for implementation

rests with individual nations. The U.S. EPA says it has received no applications for permits to release iron, but Margaret Leinen, chief scientist for the start-up company Climos, says EPA officials told her that the process will be similar to that for other permitted activities. Leinen says she is hopeful that future federal legislation on carbon

markets also will address OF.

The convention statement sends a clear message to governments that met at the UN climate conference in Bali, Indonesia, says Kristina Gjerde of the World Conservation Union. She notes that the Intergovernmental Panel on Climate Change Working Group III report on mitigation of climate

change describes OF as “speculative and unproven, with the risk of unknown side effects.” The world community “needs to consider the full range of impacts of proposed geoengineering fixes and to ensure they are properly regulated to prevent adverse impacts on the environment,” she contends.

—NOREEN PARKS

Energy efficiency as an energy resource

Program your home heater to run lower while you're out, or install a compact fluorescent lightbulb in your reading lamp—these are easy steps to reduce energy consumption. But now governments worldwide, spurred on by improved building and machine technologies, are adopting innovative energy policies with efficiency as a top priority. These governments also are seeing progress toward another goal: energy efficiency is being implemented more as a principal mechanism to reduce greenhouse gases.

Energy efficiency has traditionally been defined as installing technologies to reduce energy losses in homes and buildings. Today, it involves much more, ranging from restructuring utility rate policies to reward utilities that help consumers use less electricity to launching education programs that teach students the link between energy use and the environment.

California leaders have made efficient use of energy their top policy priority, said Dian Grueneich, a commissioner at the California Public Utility Commission (PUC), which regulates utilities, transportation, and telecommunications in the state.

Grueneich was one of several speakers in November to represent state or provincial governments at the Energy Efficiency Global Forum sponsored by the nonprofit

Alliance to Save Energy (ASE).

Scarred by price swings and blackouts in 2001 caused by the deregulation of the state's energy industry, state leaders, who have been pushed forward by Gov. Arnold Schwarzenegger's (R-CA) commitment to address global warming, have concluded that



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Studies indicate that commercial buildings will use 25% less energy if a building tune-up is conducted to repair and adjust controls used for heating, air conditioning, hot water, and lighting equipment, without making large investments in new equipment.

“you essentially have to have energy efficiency as the linchpin if you want the economy to thrive,” Grueneich said. Efficiency programs, some of which have been in place for 30 years, are now annually saving more than 40,000 gigawatt-hours of electricity—avoiding the need to build 24 large (i.e., 500 megawatt) power plants, PUC said.

Every state in the U.S. has some form of efficiency policy, said Lowell Unger, policy director for ASE. Soaring energy prices as well as electricity demand, air pollution,

and climate change are encouraging innovative programs. President Bush recently signed legislation to raise the corporate fuel efficiency standard for automobiles from today's average of about 25 miles per gallon (mpg) to an average of 35 mpg for each car maker's fleet.

But moving governments to take action hasn't been easy. “It took a crisis to sort of jolt us out of complacency,” said Mark Gordon, Director of Strategic Environmental Management, Provincial Government of the Western Cape of South Africa. In December 2005, the Western Cape suffered an electricity blackout, because a major nuclear power plant temporarily shut down, causing a \$3 billion loss to the economy. The blackout acted as a wake-up call to citizens who had been wasteful with cheap energy. “[A] whole environmental [consciousness] was really felt at the time, which led to behavior changes on the part of consumers,” said Gordon. The government rushed ahead with mandates

to reduce energy use and to develop a sustainable and efficient energy policy. “Cape Town province will be the most affected by climate change,” Gordon said, and a climate change response plan is now in development.

However, most consumers have little idea of the power behind large programs that use technologies to improve energy efficiency, especially when aimed at reducing greenhouse gases, experts said. A report from the management consulting firm McKinsey & Co.,