

ENVIRONMENTAL POLICY

Tougher Ozone Accord Also Addresses Global Warming

Come for the ozone layer, stay for the climate. That come-on might have been the marketing spiel for negotiators meeting last week under the aegis of the United Nations Environment Programme to strengthen the Montreal Protocol, the 20-year-old accord on chlorofluorocarbons (CFCs) and other chemicals that deplete the ozone layer. And it worked. The delegates who returned to the city from which the 1987 treaty got its name also made significant progress in combating global warming by recognizing the fact that most chemicals affected by the treaty are also potent greenhouse gases and that restricting them pays double dividends.

The thin shell in the stratosphere that protects Earth from the sun's rays has a variety of enemies, and the Montreal Protocol has been tightened four times as scientists have placed restrictions on newly recognized threats. As a result, the rate of harmful emissions has slowed (see graph), and more than 90% of the production and use of ozone-depleting chemicals has been phased out. The biggest threats may have passed, say experts, but this year's weeklong meeting set itself two main goals: to clamp down on ozone-harming refrigerants that have become prevalent in the developing world, and to do it in a way that could provide tangible side benefits for climate.

By the end of the meeting, they could claim to have met both goals. Most impressive was an agreement by delegates to push forward by a decade a legally binding schedule to phase out in developing nations a family of chemicals called hydrochlorofluorocarbons (HCFCs). The 191 participating nations also pledged to finance a transition fund, currently funded at roughly \$150 million per year, to support the conversion to alternatives. And with the urging of U.S. officials, the delegates also pledged to make sure that the HCFC replacements would have the lowest possible harmful impact on global warming.

"The delegates deserve lots of credit for both recognizing and seizing a historic opportunity to protect both the ozone layer and the climate," says Alexander von Bismarck of the Environmental Investigation Agency, a London-based nonprofit that has monitored

the treaty. Activists hope the action gives momentum to international meetings on climate change occurring in New York and Washington, D.C., as *Science* went to press.

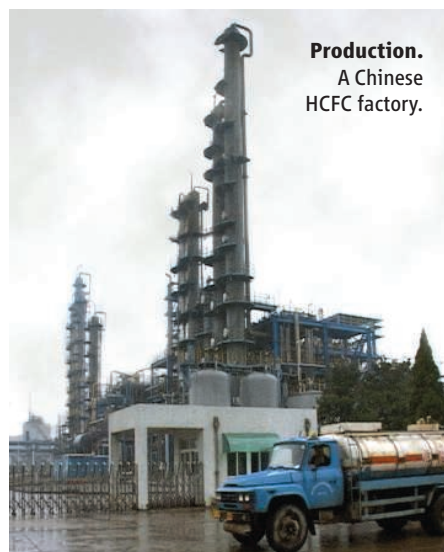
The Montreal Protocol arose out of two scientific developments. In 1974, chemists F. Sherwood Rowland and Mario Molina calculated that CFCs, a common ingredient in spray cans, could destroy stratospheric ozone. Although that discovery led to some voluntary curbs on their use, the impetus for mandatory action came in 1985, when British scientists measured an ozone "hole" over the Antarctic. The new agreement is consistent with the findings of a scientific assessment in August

that said an accelerated HCFC phaseout in developing countries would produce the equivalent savings of 18 billion tons of carbon dioxide emissions by 2050. HCFCs were meant to be a transition chemical as countries phased out CFCs, but they have been widely used as coolants in the booming economies of China and India.

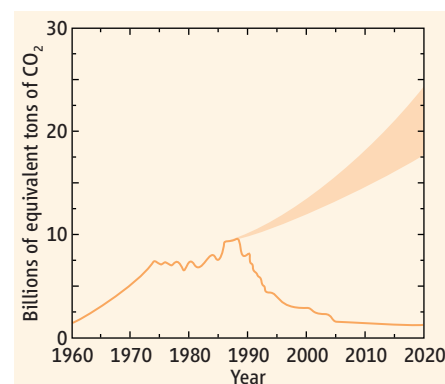
The agreement would freeze HCFC production by developing nations in 2013—2 years earlier than planned—followed by successive cuts until production was ended in 2030, a decade sooner than previously agreed. Developed nations agreed to advance their deadline for a phaseout from 2030 to 2020, as well as promising to provide "stable and sufficient" funds for replacements while "taking into account global warming potential" in deciding which chemicals to accept as substitutes.

"You couldn't have imagined this 5 years ago," says Durwood Zaelke of the nonprofit Institute for Governance and Sustainable Development (IGSD) in Washington, D.C. The current availability in China of products with many of the HCFC alternatives bodes well for the new agreement, says DuPont chemist Mack McFarland. An important driver during talks was a statement from the G8 summit in June, pushed by the U.S., pledging the industrial powers to climate-friendly action on ozone. "It's being held up [as an inspiration] by all the parties" during negotiations, said IGSD's Scott Stone, who attended last week's conference. "This [showed] great leadership by the White House."

The reviews weren't entirely positive. Delegates agreed to U.S. demands to continue an exemption for ozone-unfriendly methyl bromide, a fumigant used by U.S. farmers, allowing annual emissions of 4600 tons. David Doniger of the Washington, D.C.-based Natural Resources Defense Council, which wants a full phaseout, called that "a black mark" on an otherwise strong U.S. performance. White House environment aide James Connaughton says U.S. negotiators hope to build on the success in Montreal during a 2-day meeting hosted by the Bush Administration this week attended by representatives from 15 industrial nations and major emitters. —ELI KINTISCH



Production.
A Chinese
HCFC factory.



Protection. The 1987 ozone treaty has reduced global greenhouse gas emissions that otherwise would have risen sharply.