Climate burden of refrigerants rockets

Environmentalists push for tougher regulation of chemicals meant to help the ozone layer.

Modern refrigerants designed to protect the ozone layer are poised to become a major contributor to global warming because of their future explosive growth in the developing world, scientists report this week.

Hydrofluorocarbon chemicals (HFCs) were developed to phase out ozone-depleting gases, in response to the Montreal Protocol. But they can be hundreds or thousands of times more powerful than carbon dioxide as greenhouse gases in trapping heat. HFCs are deployed in refrigerators and air-conditioning units, and their use is poised to grow in the coming decades.

In the new study, a team led by Guus Velders at the Netherlands Environmental Assessment Agency in Bilthoven analysed the latest industry trends and then modelled HFC production to 2050. Their results suggest that HFC emissions could be the equivalent of between 5.5 billion and 8.8 billion tonnes of carbon dioxide annually by 2010 — roughly 19% of the projected CO₂ emissions if greenhouse gases

continue to rise unchecked (G. J. M. Velders *et al. Proc. Natl Acad. Sci. USA* doi:10.1073/pnas.0902817106; 2009).

The new numbers will fuel the efforts of environmentalists and others who have been pushing for aggressive new HFC regulations. Manufacturers could shift towards using HFCs with the lowest climate impact during the transition to a new generation of refrigerants — still under development — that affect neither the ozone layer nor the climate.

“Now is the moment to make a decision to steer this in a direction that you want,” Velders says. “The developing world is already in the transition to HFCs.”

Although it makes no policy recommendations, the study could play into an ongoing political debate on regulating the chemicals. HFCs currently fall under the umbrella of the Kyoto Protocol on climate change, but advocates say the fastest and cheapest way to handle them is under the ozone treaty. Montreal delegates plan to discuss the issue

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Air-conditioning in cars is a major HFC source.

when they meet in Geneva next month.

Durwood Zaelke, who heads the advocacy group Institute for Governance and Sustainable Development in Washington DC, says the Velders study confirms the potential benefits of regulating HFCs under the Montreal agreement. It will, he says, help build momentum as the delegates move towards a decision in November.

Deficit dooms Swedish gene institute

Cost overruns have sliced into the historically important biology programme of Sweden's Lund University, culminating in a departmental reorganization that has some scientists fuming.

The Institute of Genetics, where in the winter of 1955–56 the correct number of human chromosomes was established (J. H. Tjio & A. Levan *Hereditas* 42, 1–6; 1956), is being disbanded and four researchers laid off in a bitter reshuffle.

“Some researchers feel they can't afford to be nice to their colleagues,” says Sven-Axel Bengtson, who directs the university's 274-year-old Museum

Úlfur Árnason will lose his office.

of Zoology. “When food is scarce, the horses will bite.”

Acrimony peaked last week, when an emeritus professor was notified that he would lose his office by 30 June. Úlfur Árnason, who has been associated with the university for more than 50 years, was told he was to be ejected shortly after he sent a lengthy critique on the biology reorganization to the university's top executive, rector Per Eriksson. Árnason was among the few who openly questioned the proposal, contending it would undermine science at the university, reduce enrolment and cause revenue to drop further. He

also noted that the vision group directed by zoologist Dan-Eric Nilsson, ranked ‘outstanding’ in a 2003 external review, was being cut, whereas a plant-research group criticized in the same review as being without focus was left largely untouched. Susanne Widell, who leads the plant group, is directing the biology reorganization; she did not respond to an interview request.

Árnason became an emeritus professor four years ago, as Swedish researchers do at age 67. Typically, such professors are permitted a university office if they continue research, as Árnason does. He is fighting the ousting.

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ALAN SCHEIN PHOTOGRAPHY/CORBIS

The Montreal treaty, which came into force in 1989, has implementation experts in virtually every country and has already succeeded in reducing 96 chemicals by 97% each, Zaelke says. "It's a winning record, and we need to give the treaty this shot."

In 2007, Velders' team looked at the effect of the Montreal Protocol and found that its

incidental greenhouse-gas reductions — equivalent to 11 billion tonnes of CO₂ annually by 2010 — are five to six times greater than those of the Kyoto Protocol. Montreal participants had already agreed to phase out chlorofluorocarbons by 2010 and hydrochlorofluorocarbons by 2040, but the Velders study helped convince them to accelerate phasing out the latter by a decade in order to capture the climate benefits.

The latest study carries that work forward and suggests that the problem posed by HFCs could be several times larger than projected by the Intergovernmental Panel on Climate Change (IPCC) in its 2007 assessment. Using the IPCC's baseline economic scenarios, the work assumes that refrigerant technologies will be deployed at levels roughly equal to those in the developed world today. By mid-century, emissions in currently developing countries would rise to levels eight times higher than those in developed nations.

Venkatachalam Ramaswamy, a coordinating lead author of the IPCC chapter covering HFCs who was not involved in the study, called the paper "a very good piece of work".

"It elevates the importance of HFCs in terms of climate forcing to a level higher than we may have thought initially," says Ramaswamy, a scientist at the National Oceanic and Atmospheric Administration's Geophysical Fluid Dynamics Laboratory in Princeton, New Jersey.

Still, he says, it "doesn't significantly detract from the attention that CO₂ and methane should be getting."

Jeff Tollefson

G8 cancels science parley

The Italian government has caught scientists off guard by cancelling the G8 science and technology meeting that was to have begun on 25 June.

The meeting would have brought together science ministers of the G8 nations to discuss issues such as how to monitor climate change and maintain environment-friendly energy supplies.

It was one of ten ministerial meetings to prepare for the main G8 summit, in L'Aquila, Italy, in July. The summit is now left without a formal mechanism for introducing science input.

"We were surprised and disappointed by the cancellation," says James Wilsdon, director of science policy for Britain's Royal Society. The society is one of 13 national academies — one from each of the G8 countries, plus one each from South Africa, India, Mexico, China and Brazil — that had prepared a joint statement on climate and energy policy to funnel through the meeting.

The Italian government gave no clear reason for the cancellation, the first time a planned ministerial meeting has been cancelled in advance of a G8 summit. Italian newspapers have reported that government officials are referring variously to concerns about security and failure to complete translation of relevant preparatory documents.

Giuseppe Fioroni, science spokesman for Italy's opposition Democratic Party, says that the cancellation — which he puts down to infighting between ministries in the Italian government over the core themes of the research G8 meeting — is "humiliating for Italy as the host country".

The Italian Ministry of Education, Universities and Research did not respond to interview requests.

An official at the German research ministry said they had been told that the meeting would be reconvened in some form this autumn. "It is always good when G8 ministers meet," he said. "It does not have to be before a summit."

But Fioroni says a research meeting has meaning only if it takes place before the main summit.

Alison Abbott

"This is very extraordinary, to be expelled from the faculty," he says.

"It is quite astonishing," agrees Lennart Ståhle, a senior adviser at the Swedish National Agency for Higher Education in Stockholm.

At its peak, the genetics institute was home to about 80 researchers. The two dozen researchers there now will be reposted elsewhere within the university, and the existing genetics labs largely turned into offices.

University officials and researchers say that the reorganization was brought on by a series of compounding problems, many of which other universities also face, Ståhle

says. At Lund, officials say, too many young researchers were kept on without outside funding to support them.

The annual budget deficit of the Department of Cell and Organism Biology, which oversees the genetics institute, has been ballooning over the past couple of years, increasing by up to 100,000 Swedish kronor (US\$12,500) a week, and is expected to hit 19 million kronor by year-end.

The science faculty board has approved a 10-million-kronor subsidy, which, combined with staff reductions, is intended to eliminate the

deficit in three years.

Ecologist Torbjörn von Schantz, dean of the science faculty, said he "deeply regretted" the "tragic" cuts in staff, which he acknowledged will reduce future graduate-student admissions. But he added that the steps are necessary to save money.

"We see the restructuring of biology in Lund as a key to addressing new areas of research," he says.

However, several other professors privately questioned whether students would want to come to a department in turmoil.

Rex Dalton

"This is very extraordinary, to be expelled from the faculty."