Refrigeration That Won't Heat Up the Planet

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A group of greenhouse gases you've probably never heard of contributes much more than its share to climate change. Known as F-gases, these chemicals are used to cool drinks, food, cars, supermarkets and office buildings. But they are also "super-greenhouse gases" that heat up the globe and cause climate change. Greenpeace campaigns to phase out these gases and promote climate-friendly refrigeration solutions, including our breakthrough GreenFreeze refrigeration and SolarChill cooling technology.

F-gases are climate culprits

F-gases, or fluorinated gases, are an entirely synthetic group of gases used in refrigeration and air conditioning. They are also found in foams, aerosols, fire protection and solvents, and have a range of other industrial uses.

As very potent greenhouse gases, F-gases' global warming effect is up to 23,000 times greater than carbon dioxide. Even small concentrations can have big effects on global temperatures. Some F-gases live in the atmosphere for up to thousands of years. Others with very short atmospheric life times have their most intense global warming effect over a few decades.

The four main categories of F-gases are:

- hydrofluorocarbons (HFCs)
- perfluorocarbons (PFCs)
- sulfur hexafluoride (SF6)
- nitrogen trifluoride (NF3)

We must not trade an ozone problem for a climate one

Chlorofluorocarbons (CFCs) are F-gases phased out by the Montreal Protocol because they deplete the ozone layer. The phase-out of hydrochlorofluorocarbons (HCFCs) is underway for the same reason.

Hydrofluorocarbons (HFCs) were created to replace CFCs and HCFCs.

Yet HFCs' creation posed a new problem. Although they do not deplete the ozone layer, HFCs are a threat to the climate because they are potent greenhouse gases.

Understanding the HFC climate threat

HFCs' average lifetime in our atmosphere is quite short, around 22 years. Yet the global warming potential of HFC-134a, the most widely used HFC, is 3,830 times greater than carbon dioxide over 20 years.

F-gases enter our atmosphere when refrigerators, air conditioners and other cooling equipment leaks, or when it is improperly serviced or disposed of.

If this equipment was properly constructed, serviced and disposed of, this could limit F-gas releases for a time. But in reality almost all F-gases produced will eventually find their way into our atmosphere.

- Take HFC-134a; the industry admits 59 percent of the total quantity ever produced is already in the atmosphere.

A problem we must — and can — quickly solve

If HFC use is not immediately cut back and phased out worldwide, these chemicals could make up an estimated 9 to 19 percent of total greenhouse gases in our atmosphere by 2050.

The good news is an HFC phase-out is among the most cost effective measures readily available today to tackle climate change. And eliminating F-gases soon could help buy more time for the fundamental shift we must make from polluting fossils fuels to 100 percent clean, renewable energy.

The international community has finally acknowledged HFCs' threat to the climate; a movement to phase down HFC use is taking place under the Montreal Protocol.

Greenpeace campaigns for climate-friendly alternatives

We knew the switch from ozone-destroying to climate-destroying gases is simply not necessary. And we acted. We've campaigned against large-scale uptake of HFCs ever since the chemical industry first promoted them to replace CFCs and HCFCs.

Our GreenFreeze refrigeration technology

In the early 1990s, Greenpeace developed GreenFreeze refrigeration technology to show climate-friendly alternatives exist. Instead of HCFCs and HFCs, GreenFreeze uses hydrocarbons as the blowing agent for the insulation foam and as the refrigerant. Hydrocarbons are ozone friendly, and have minimal global warming impact when used in refrigeration.

GreenFreeze is a triumph of "can do", inspiring proof of workable solutions to climate change. When we made GreenFreeze freely available to the world, it revolutionized the global household refrigeration market. Today there are more than 800 million GreenFreeze refrigerators worldwide. GreenFreeze technology represents between 35 and 40 percent of the 100 million domestic refrigerators and freezers produced worldwide each year. Looking ahead, the share of hydrocarbon-based refrigeration is expected to continue to grow.

SolarChill breakthrough cooler technology

In 2000, Greenpeace spearheaded the successful development of SolarChill, a vaccine cooler and food refrigerator. SolarChill coolers capture solar energy and store it as ice, instead of in batteries. SolarChill is climate-friendly and lead-battery free. An ice compartment keeps the cabinet at desired the temperature during the night.

Today there are over 10,000 SolarChill vaccine coolers around the world. The SolarChill food refrigerator is yet to be commercialized. Nevertheless, Greenpeace is aiming to use SolarChill to bring refrigeration to nearly three billion people who lack reliable electricity supply.

Greenpeace works with others to phase out F-gases

Greenpeace continues to encourage governments, business and industry to work together to eliminate F-gases completely. We also seek to ensure F-gases already inside products are captured and safely destroyed.

- We support the Refrigerants Naturally! coalition, which includes large corporations that have agreed to phase-out HFCs and replace them with natural refrigerants.
- We collaborate with the Consumers Goods Forum, a consortium of hundreds of global companies aiming to shift to sustainable refrigeration and cooling technologies.

What can you do?

- When you dispose of older refrigerators and air conditioning units, make sure they are recycled or responsibly landfilled. This minimizes the risk that climate- and ozone-harming gases will escape into the atmosphere.
- If you plan to buy a new refrigerator, choose one that uses GreenFreeze technology!
- Tell your supermarket, department store or other commercial facilities to switch to climate-friendly cooling.
- Demand that your government mandates the early phase-out of HFCs wherever alternatives are possible.

More information

- Facts about HFCs
- Alternatives to HFCs and F-gases
- Cool Technologies: Working without HFCs
- Greenpeace history of fighting F-gases