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## **Greenfreeze: from a snowball to an industrial avalanche**

### **The cool story of the phase-out of CFC and HFC in refrigeration**

The 1997 UNEP Ozone Award-winning Greenfreeze technology is the most environmentally sustainable domestic refrigeration technology currently available. Developed by Greenpeace in 1992, Greenfreeze is now cost effective, technologically mature and commercially accepted in most major markets. There are nearly 150 million Greenfreeze refrigerators in the world today. Greenfreeze technology is produced by the largest appliance manufacturers in western Europe, China, Japan and India. Greenfreeze is also produced in Australia, Argentina and Cuba. It is only artificially created obstacles that have prevented the introduction of Greenfreeze on the North American market.

Until the early 1990s, virtually all domestic refrigerators were manufactured with ozone-depleting CFC-11 in the insulation, and using CFC-12 as the refrigerant. In 1990, the combined total of CFC-11 and CFC-12 used in domestic refrigerators was approximately 40,000 metric tons. The extensive use of CFCs was identified as one of the primary causes of the depletion of the ozone layer. As a result, under the Montreal Protocol to Control Ozone Depleting Substances, governments agreed to an international phase-out schedule for CFCs, and on the need to replace CFCs with new technologies.

Chemical companies and their corporate clients in the appliance manufacturing sector turned to HCFCs and HFCs as the replacement substances for CFCs. These substances are not sustainable: HCFCs are also ozone depleting, and both HCFCs and HFCs are potent global warming gases. HCFCs are scheduled to be phased out, like their predecessors, under the Montreal Protocol. HFCs are included in the Kyoto Protocol's basket of greenhouse gases, whose combined emissions must be reduced in order to protect the global climate.

### **A short history of Greenfreeze:**

#### **1992**

To prevent these harmful CFC-substitutes becoming entrenched in the global market, Greenpeace set out to develop an alternative refrigeration technology. Applying the precautionary principle, the organization became convinced that the future of environmentally safer refrigeration was with natural substances, such as hydrocarbons, CO<sub>2</sub>, ammonia, water and air.

Greenpeace found an industrial partner in the East German-based company FORON. FORON built the first ten Greenfreeze prototypes. Greenfreeze refrigerators are entirely free of fluorocarbons, CFCs/HCFCs or HFCs, in both the refrigerant cycle and the insulation. Instead, Greenfreeze uses isobutane for the refrigerant and cyclopentane for blowing the insulation foam.

Within three weeks, Greenpeace amassed 70,000 sales contracts from the German public and proved to the manufacturers that there was a demand for environmentally safe refrigerators.

#### **1993**

On 15 March, the first Greenfreeze refrigerators rolled off the FORON assembly lines. Within a year, the technology spread throughout Germany and to other European countries.

The same year, Greenpeace introduced Greenfreeze technology to China and Japan.

#### **1994**

Greenpeace cooperated with China's largest fridge-producer, Kelon, in the production of Greenfreeze refrigerators. Greenpeace also facilitated cooperation between Western appliance manufacturers and Chinese refrigerator makers.

Swiss and German government agencies began to promote hydrocarbon refrigeration technology in India and Pakistan.

#### **1995**

Greenfreeze technology receives further attention from Chinese companies and Greenfreeze is produced in Australia.

## 1996

The second phase of the Greenfreeze initiative aimed to convince large commercial users of refrigeration and air-conditioning equipment to shift away from fluorocarbons. The campaign initially focused on European supermarkets. A number responded to the Greenpeace campaign by deciding to shift from fluorocarbon refrigeration and cooling to "natural refrigerants" such as hydrocarbons and ammonia.

## 1997

The two biggest Chinese refrigerator producers, Kelon (in southern China) and Haier (in northern China), start producing Greenfreeze refrigerators. On the tenth anniversary of the Montreal Protocol, Greenfreeze was awarded the UNEP Ozone Award.

## 1998

In 1998, the campaign turned its attention to the major corporate sponsors of the 2000 Sydney Olympics – giant food and beverage companies such as Coca-Cola, McDonald's and Unilever Ice Cream, whose daily operations use millions of refrigeration units worldwide.

## 2000

The campaign escalated in 2000 as the opening date of the Sydney Olympics approached. Greenpeace took various initiatives to convince the corporate sponsors of the Games to adhere to the "Environmental Guidelines" issued by the Olympic Committee.

June 28: Coca-Cola announced plans for a global phase-out of hydrofluorocarbons (HFCs) in refrigeration by the Athens Olympic Games in 2004. Coca-Cola also announced its intention to expand research into refrigeration alternatives. The Coca-Cola announcement was soon followed by similar commitments from McDonald's and Unilever Ice Cream.

## 2001

Greenpeace, together with five other international organisations (UNEP, WHO, UNICEF, GTZ, DTI) began a project to develop a solar refrigerator and vaccine cooler that is environmentally friendly and bypasses the use of batteries ("SolarChill"). The

project is ongoing, with prototypes currently being field-tested in Senegal, Indonesia and Cuba.

## 2002

Following several years of public campaigning by Greenpeace, the largest Japanese refrigerator manufacturers began to produce and market Greenfreeze refrigerators for the Japanese market.

## 2003

By the tenth anniversary of the first commercialised production of Greenfreeze, over 100 million Greenfreeze refrigerators had been produced worldwide. The first Greenfreeze refrigerators in South America are produced in Argentina and Brazil.

## 2004

Commitment of three world-leading companies to phase out HFCs and commercially introduce alternative technologies such as Greenfreeze "in the imminent future".

## Demands:

- **Governments** must phase out HFCs immediately. For the few exceptions, for which no immediate substitutes exist, specific dates for their phase-out must be fixed. None of the time frames ought to exceed five years.
- **Governments** must tax the use of HFCs until phase-out. This tax is based on the global warming potential and, consequently, on the environmental impact of these applications.
- **The Parties of the Montreal Protocol** must stop the funding HFC projects through the Multilateral Fund and dramatically accelerate the phase-out of HCFCs.
- **Governments** need to establish a compensatory fund into which HFC-producers must pay. This fund would compensate for environmental and human health costs arising from the extensive use of HFCs.
- The **European Union** must introduce immediate phase-out dates for HFCs in all applications in its proposed Fluorinated Gases Regulation.